



FRIDAY, SEPTEMBER 27, 1878.

Contributions.

Chilled Cast-Iron Wheels and Hungarian Locomotives at the Paris Exhibition.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The use of chilled cast-iron wheels is slowly but steadily getting into favor in Europe, especially on the Austro-Hungarian railroads, which have for many years been using them with the best results. That there is yet a great future and a good chance for our American manufacturers to introduce them into the distant countries, I do not doubt; but the work must be pursued in a little more energetic manner than it has been hitherto. Especially now, when the existing prejudices against cast iron are disappearing, and the manufacture of the chilled cast-iron wheels is still, if not as to the quality yet as to the quantity, in its infancy in Europe, no pains should be spared to open a market that will benefit European railroads and the pockets of enterprising American manufacturers. Much could have been accomplished already during the present exhibition in Paris had the wheel-makers taken a little more care to have their goods properly exhibited, with competent assistants at hand to give information. An agent of a European wheel-maker at the exhibition asked me, in the third month from the opening, if I knew where the American wheels were. I sent him to the section where cheese and lard are exhibited. At another time I could not get a circular or any information regarding the prices of wheels, for a gentleman prominently connected with a railroad company, who has been specially interested in wheels.

The well-known firm of Ganz & Co., of Buda-Pest, Hungary, had, in the Hungarian section of the Austrian Exhibition, a very prominent show of chilled cast-iron wheels, frogs, projectiles, and a few other objects of that material. These wheels could be seen at a greater distance than any other exhibit in the machinery hall, being placed high on the wall, one above the other. All possible information, statistics, and everything that could speak in favor of the exhibit, were liberally given to parties interested. I was told that the firm was doing a good business there.

In the year 1844, Mr. A. Ganz, a Swiss citizen, established in Buda a foundry; but only in 1854, being induced by some railroad engineers, did he begin to experiment in chilling cast iron; and, having on hand Hungarian ores of superior quality, he was able, in 1857, to execute some important orders for chilled wheels for the Austrian and Hungarian railroads. From that time the establishment has been growing, and, after the death of its founder, in 1867, passed into the hands of a large stock company, of which Mr. P. de Somssich is the President, and Mr. A. Mechwart the Manager.

The highest number of wheels produced by this establishment in a year was 36,000, in the year 1873; but owing to the industrial crisis of 1873 it has fallen off, and only during the last two years has been increasing again, amounting now to 23,000 wheels a year. In 1867, 100,000 had been cast, 200,000 in 1871, 300,000 in 1874, and 400,000 will probably have been cast by the beginning of next year. The wheels were furnished to 30 different railroad companies. The manufacture of railroad frogs and crossings from the same material is also an increasing industry. The depth of the chill of the wheel tread is from $\frac{3}{8}$ to nearly $\frac{1}{2}$ in. Specimens of wheel sections are exhibited, and some old wheels, among which one, No. 423, has run 128,978 $\frac{1}{2}$ miles, and another, No. 3,684, has run 340,446 $\frac{1}{2}$ miles, as certified to by the Mohacs-Fünfkirchen Railroad Company. They are both from under cars in light service, and hardly show any wear.

Some of the most prominent railroad men in Europe have been advocating the use of chilled cast-iron wheels. Baron M. M. von Weber, in his report to the Minister Bauhaus (Vienna, May 31, 1874), recommended them for freight cars, as being more economical and safe; he proves by statistics that there is but one-tenth as many accidents from the breaking of chilled wheels as from others, and he adds that they are still susceptible of improvement, and that the principal amelioration has been, so far, attained by the process of revolving the metal cast, and thus making the heavier parts move to the surface, while the scoria, which in three-fourths of the cases is the principal cause of defects, separates and is got rid of.

A report from 22 months' observation (Jan. 1, 1870, to Oct. 30, 1871), given to the Imperial Royal General Inspection of the Austrian Railroads, taken from 10 different lines, gives the total number of forged wheels with tires as 95,198, and of chilled cast-iron wheels as 57,926; out of these numbers, during the 22 months, there were 322 of the former broken and only 13 of the latter, which amounts respectively to 0.333 and 0.029 per cent.

Mr. C. Hornbostel, Director of the shops of the Empress Elizabeth Railroad, reported in 1876 to the *Centralblatt für Eisenbahnen und Dampfschiffahrt*, of Vienna, the average life of chilled cast-iron wheels to be seven years. I could not ascertain the mileage, but was told by an Austrian engineer that it will amount to about 80,000 kilometers a year (12,400 miles). The usual diameter of wheels is one meter (39.37 in.).

The Emperor Ferdinand Northern Railroad, as early as

1855, began to use chilled cast-iron wheels, and ever since has increased their number, so that now with 10,000 freight cars, it has 23,140 such wheels (21,696 from Ganz & Co., and 1,444 from Count Andrássy's Works, at Dornoe).

The following figures are deduced from a table giving some data concerning the life of chilled wheels on the Northern Railroad. The time is given and not the mileage; the latter can be, however, approximately found by substituting 12,400 miles (20,000 kilometers) a year. Every wheel is guaranteed to last five years, and in case of failure is exchanged by the manufacturer.

Between the years 1855 and 1872, 34,309 chilled wheels were bought; of these, 25,497, or 74.31 per cent., were exchanged before reaching five years of service, and up to 1878 6,505 more, or 19.25 per cent., had been disabled leaving but 2,307 still in use. Of the latter number 10 have been running since 1862, 41 since 1864, 129 since 1865 and 1867, 530 since 1868 and 1869, 709 since 1870, and 888 since 1871 and 1872. In the last five years an additional number of 24,854 was bought, and of these 5,465 have failed already. The average life of those wheels that failed before reaching the guaranteed time was 3.1 years, and the average life of wheels which exceeded five years but failed before 1878 was seven years, giving a total average life of 3.9 years for the wheels that failed. The 2,307 wheels still remaining—which if they failed now would give an average of 8.1 years—will doubtless never exceed a grand total average of 4.5 years. From 1865 to the present time only 13 wheels have been broken.

The Ganz & Co. establishment tests every wheel before it leaves the shop, by turning it on an emery wheel; if any part of the tread is soft, it is discovered and the wheel cast over again.

Sweden is also manufacturing chilled cast-iron wheels, and the establishment Arboga Mekaniska exhibits some samples of them. They do not use them, however, on their standard-gauge roads, but on the narrow gauges and for tramways; they are also exported to England and Russia. The number of wheels manufactured does not exceed 2,500 a year.

HUNGARIAN LOCOMOTIVES.

The Royal Hungarian State Railroads exhibit a six-wheel coupled locomotive, constructed at their works in Buda-Pest (where Mr. F. Zimmermann is Director), and intended for the Theiss Railroad, being a new type adopted for fast mixed or passenger traffic. It is able to haul 750 tons on a grade of $\frac{1}{100}$ (6.6 feet per mile) at a speed of 24 kilometers (14.88 miles) an hour. All axles are rigid, there being no sharp curves on the line; the rear axle is under the fire-box, which is made shallow, with an inclined grate; the wheels and cylinders are outside; the springs are below the axles, the rear and the middle being equalized; the fuel being wood, the smoke-stack is provided with a spark-arrester of the Klein system; the exhaust is variable. It has been constructed almost entirely of Hungarian material, cast-steel being freely used, and all joints case-hardened. It appears to be in every respect of the best workmanship. Its peculiarities, if not many, are not without importance, namely, the distribution of steam, being accomplished by the use of balanced piston valves, presents a new character in locomotive construction. The steam-chests are below the cylinders, and the valves are moved from the Stephenson link, placed inside of the frames, by means of a rocker. All the advantages obtained by this arrangement, which after all, nobody doubts, should outweigh the objections which can be made against it, before it can be called a success. The constructors thought the only objection to be the collection of water in the steam-chests, which, not escaping freely enough, might act destructively; they have obviated this by placing the steam-chest below. I fear that before long the valves will give some trouble on account of leaking, unless something is done to prevent the cinders from entering the chest when the engine is reversed, while the locomotive is still running in its former direction (this may rarely happen, yet because it does, it should not be disregarded); another objection is in the construction of the valve, which has packing. In America we have had long experience with piston valves on stationary or portable engines, and it has been found that the best piston valve is one that has no packing but is of a single block, of the same material as its seat, well fitted; it will work thus for several years, and then the seat has to be bored and a new, larger valve substituted. The designers of this locomotive believe that they are the first to use piston valves on locomotives; an American fireless locomotive built a few years ago (1874) had such valves, but they proved to be a failure. Such valves were also used on the Milwaukee & St. Paul Railway, and experiments have recently been made with valves of this kind, designed by Thos. S. Davis, on a locomotive on the Pennsylvania Railroad. The throttle has a valve similar to that of the steam cylinder, and the link is counter-balanced by a spring instead of a weight. The latter is generally used in Europe, and causes a great deal of jar and shaking on the mechanism when the locomotive is in motion.

The dimensions of this locomotive are as follows:

Diameter of cylinders	1 ft.	4.53 in.
Stroke of pistons	2 "	0.80 "
Diameter of driver	5 "	3.06 "
Wheel-base	11 "	11.70 "
Diameter of boiler	4 "	3.65 "
106 tubes, 2.04 in. outside diameter, long, between plates.	11 "	5.79 "
Heating surface of the tubes		1,022.50 sq. ft.
" fire-box		96.87 "
" total		1,119.43 "
Area of grate		21.20 "
Weight of locomotive empty		26,000 lbs.
" loaded		74,800 "

The cost of the locomotive at the railroad station in Budapest was 55,000 francs (\$11,000).

Another Hungarian locomotive exhibited by the State

Railroad Company, constructed at its Resicza works, for working in coal mines at the same place, is exhibited in a gallery adjoining the machinery hall, where the ores, iron, coal, and other products belonging to the company are displayed. It is for a 2 feet 3 $\frac{3}{4}$ in. gauge, with cylinders 6 $\frac{1}{2}$ in. in diameter and 8 $\frac{1}{2}$ in. stroke; the four coupled wheels are 18 $\frac{1}{2}$ in. in diameter and 37 $\frac{1}{4}$ in. apart; the total heating surface is 94.7 square feet, of which 15.1 square feet are direct heating surface; the 50 fire-tubes are 1 $\frac{9}{16}$ in. in diameter and a little over 4 ft. 6 in. long. The tank has a capacity of 35 gallons, and the coal bunker of 154 lbs.; the weight of the empty locomotive is 8,047 lbs., and when loaded 9,700 lbs.

The St. Louis Bridge and the Cincinnati Southern Railway—What was Done with \$15,000,000, and What with \$16,000,000.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The steel arch bridge over the Mississippi at St. Louis is a great engineering work. Its long spans and its erection without false work in the river have given it a distinction which it well deserves; but its enormous cost, said, including the tunnel and approaches, to be \$15,000,000, is too frequently forgotten.

The city of Cincinnati, with only \$1,000,000 more money has graded and built the masonry for a railroad 331 miles long, and has 160 miles equipped, with regular trains running. Included in the graduation and masonry are 27 tunnels, having a total length of 26,339 lineal feet. Besides the graduation and masonry there are erected 11 iron viaducts and 14 iron bridges, including the bridges across the Ohio, Kentucky, Cumberland and Tennessee rivers.

The St. Louis Tunnel is not 5,000 feet long, and the bridge, including approaches, is 6,290 ft. long. The Ohio River Bridge at Cincinnati is 4,200 ft. long and is very much better for river navigation, for the channel span of 519 ft. is nearly as long as the channel span of the St. Louis Bridge, and has the advantage of being 100 ft. above low water. The St. Louis Bridge is but 85 ft. above low water, and that only in the centre of the arch. The Cincinnati Bridge has the height of 100 ft. above low water from pier to pier. The arches in the bridge over the Mississippi River spring from high-water mark.

A great many steamboats cannot pass under the bridge at low water, for the stacks of the James Howard are 104 ft. above the water, the Richmond 97 ft., the J. A. Scudder 94 ft., and the Thompson Dean 91 ft. About one-third of the time from 1861 to 1873 the Mississippi River was 10 ft. above low water, which would give a clearance under the centre of the arch of 75 ft.

The Cincinnati Bridge has a pivot span 370 ft. long which can be turned either by hand or by steam, so that boats, with any height of stack, can pass up and down the river at all stages of the water.

One reason for the immense cost of the bridge over the Mississippi was the adoption of steel arches, there being eight of these arches to each span, which compelled the engineer to build very heavy masonry to resist their thrust. The channel span at St. Louis, including the piers on which it rests, cost about \$3,000,000. The channel span at Cincinnati, together with the piers on which it rests, cost \$355,000.

Below I have compared the dimensions of the largest pier of each bridge. Both piers rest on rock foundations, and I have compared the sizes at the bottom, the top and the number of cubic yards in each.

	Size at bottom.	Size at top.	Cubic yards.
East Pier, St. Louis Bridge ...	82×60	65×24	15,907
Pier 4, Cincinnati " ...	54×26	28½×13½	2,828

The Cincinnati Bridge has a single track, and the St. Louis a double track with a highway above it, but every engineer knows that a double-track bridge does not require twice the amount of masonry, if the same style of bridge be adopted. Some of this great difference in cubic yards is doubtless owing to the increased depth of the rock foundation at St. Louis. If the St. Louis Bridge had been constructed on the plan of that at Cincinnati, even with its double track and roadway above, this pier would not have required more than 9,000 cubic yards.

But the Cincinnati Bridge is not the only great structure on this road, built with the \$18,000,000. One hundred miles south of Cincinnati there is the most interesting structure on the road, on account of the peculiarity of its construction and its great height, 275 feet above low water, making it the highest bridge in the world. This is the Kentucky River Bridge.*

It is composed of three Whipple iron deck-spans of 375 ft each, supported by two iron piers, with masonry bases, and built by the Baltimore Bridge Company. Its mode of erection was somewhat similar to that of the St. Louis Bridge, but it looked much more bold and mysterious, no false work being used except a temporary wooden pier.

While in progress of erection, a person standing a short distance from the bridge would be puzzled to know what held it in position until 10 panels had been erected and it projected horizontally from the perpendicular rocky cliff 187½ ft., at which distance it reached the wooden pier. The centre of this pier was 196 ft. 10 in. from the shore end.

The Kentucky River Bridge was erected on this plan because it was thought that it would cost less than the large amount of false work that would be required, if erected in the ordinary way.

The erection of the iron superstructure in this peculiar

* Illustrated in the *Railroad Gazette* of Sept. 1, 1877.

tariffs, and even the transit and export tariffs, to the extreme consequences with which they sometimes have had to be reproached.

"It therefore behooves the inspectors charged with the supervision of the commercial management to study the propositions of the companies from this point of view, and not confine themselves, as they sometimes do, to registering the results of the comparison of the bases of rates per mile to be imposed with the rates actually applied, and with the figures of the legal tariff. Such a comparison, indispensable assuredly for the understanding of the new tariffs, does not, however, suffice to develop their effect and establish their economic character.

"To attain the rational examination of which I speak, the inspectors will necessarily have to put themselves into personal relations with the authorities who are best qualified to enlighten them; especially with the chambers of commerce. It will be proper that they seek among these for the demands made by the trade and industries of the districts served. They will collect the observations of the great manufacturers, or even of simply private individuals who have had occasion to find defects in the system of rates in force.

"In a word, the inspectors should become penetrated by the idea that they are the national mediators between the public and the railroad companies. Many accusations would be avoided, many misunderstandings dissipated, many difficulties smoothed away, if those interested were better informed as to the extent of their rights and their obligations by habitual communication with the supervising officials."

Rules Governing the Condition of, and Repairs to, Freight Cars for the Interchange of Traffic.

The following roads have up to date adopted these rules which were published in the *Railroad Gazette* of June 21 :

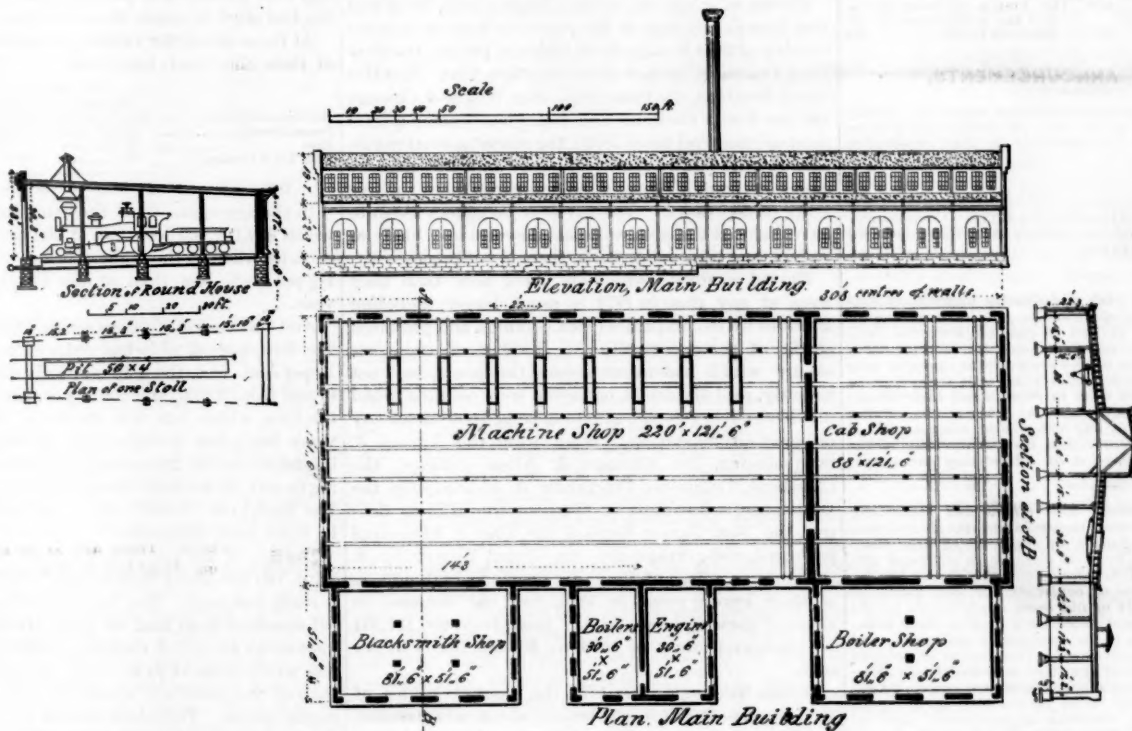
Allegheny Valley.
Baltimore & Ohio,
Cheshire.
Cairo & Vincennes.
Chicago & Alton.
Chicago & Michigan Lake Shore.
Cleveland, Columbus, Cincinnati & Indianapolis.
Cincinnati, Wabash & Michigan.
Central Vermont.
Chicago & Eastern Illinois.
Chicago & Northwestern.
Dunkirk, Allegheny Valley & Pittsburgh.
Detroit & Milwaukee.
Davenport & Northwestern.
Eel River.
Evansville & Terre Haute.
Flint & Pere Marquette.
Fort Wayne, Jackson & Saginaw.
Hannibal & St. Joseph.
Kansas Pacific.
Lehigh Valley.
Missouri Pacific.
Missouri, Kansas & Texas.
Michigan Central.
New York, Lake Erie & Western.

New York & New England.
St. Louis & Southeastern.
Saginaw Valley & St. Louis.
St. Louis, Kansas City & Northern.
Toledo, Peoria & Warsaw.
Worcester & Nashua.

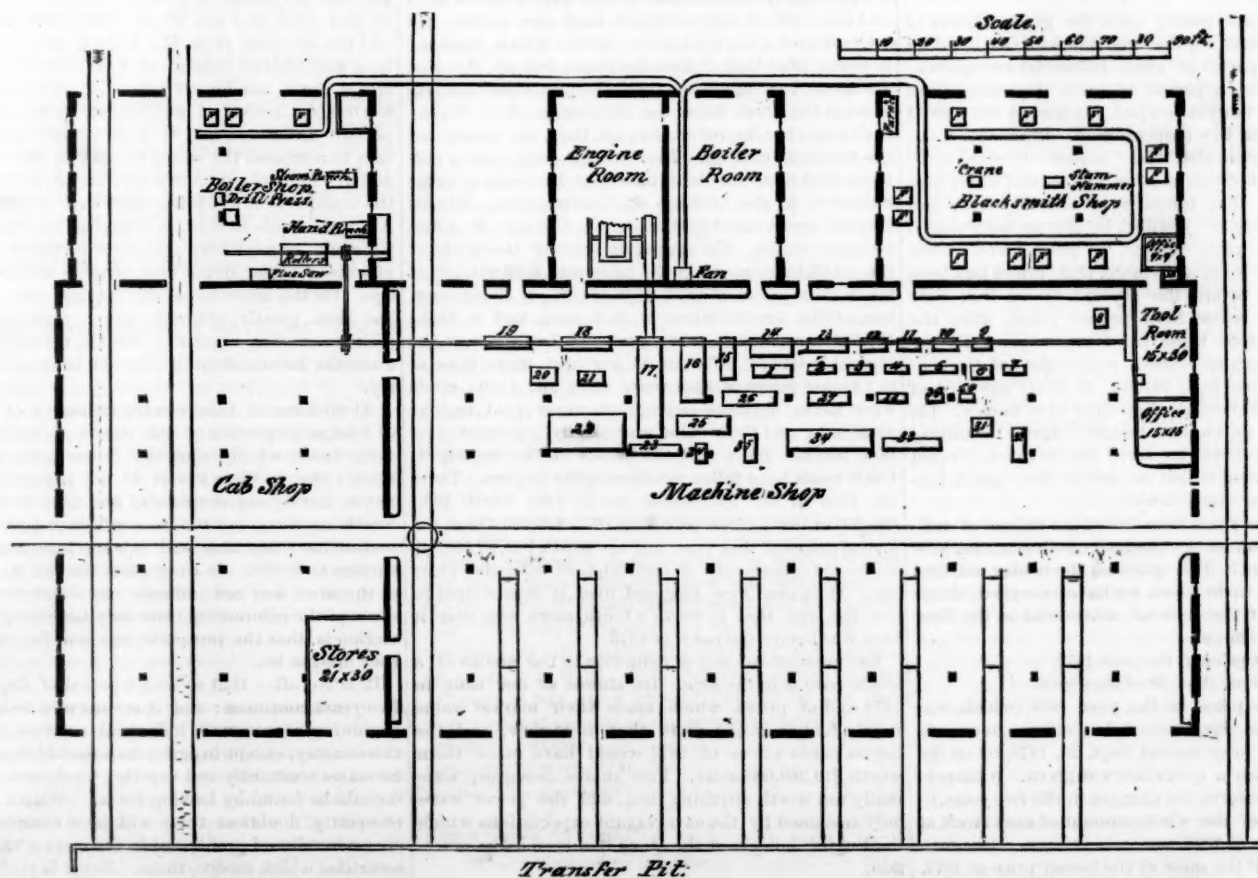
Forty-two Inch Car Wheels.

A test having been made of the value of 33-inch and 42-inch car wheels upon long distance express trains, the Boston & Albany Railway is preparing to place the larger size under all its New York through passenger cars. The average weight of the passenger cars is 25 tons, and with the seats filled the load is increased a trifle over seven tons. The life of the usual cast-iron 33-inch wheel on these long running trains is about four years, but of late the steel-tired wheel has been run a very much longer time. The new wheels will be of the steel-tire pattern, are made by a Hartford, Conn., company, and the change in all its incidentals will involve an outlay of over \$25,000. The management is confident of securing not only a stronger wheel, but one less liable to catch at the rail joints and pound the rail ends, and a much less friction in the journals and, of course, less danger from hot boxes. The through cars will all be equipped by the first of January.—*Boston Advertiser*.

One statement above seems to need a little correction. An ordinary passenger car carries from 50 to 60 passengers, and if the load is increased "a trifle over seven tons," the seats must be very well filled indeed, for the passengers must average 250 pounds each, at least.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

RAILROAD STOCKS IN 1873 AND 1878.

Five years have passed since the great failures of 1873, which caused a panic and marked the dividing line between a period of great industrial and speculative activity and a period of great depression from which we have not yet escaped. It was on the 19th of September, after the suspension of Jay Cooke & Co. and Fiske & Hatch, that the "bottom dropped out," and stocks went down at once so fast and so far that it seemed then that prices were absurdly low, and could not possibly be justified by any probable condition of affairs, past, present or prospective. Even those who were most convinced that prices had been greatly inflated before the panic, believed that they had fallen far below their proper values after the panic; and indeed these prices were generally the measure of men's necessities rather than of the convictions of any one as to values. Scarcely any wished to sell; they sold because they must have money. On the other hand, purchasers bought eagerly, counting themselves fortunate to have the so much coveted ready money with which to secure the "great bargains" offered by needy holders.

Now, after five years have tested the values of railroad properties under the changed circumstances, how do we find them? This question the reader will find answered in the table which we have compiled, showing for most of the railroad shares sold on the New York Stock Exchange:

1. The highest price in the year 1873.
2. The price Sept. 19 or 20 of that year.
3. The lowest price in the year 1873 (which was sometimes on the days named, but often afterward).
4. The lowest price quoted Sept. 20, 1878, or on the nearest day when a quotation was given. (Compare this with (3) to observe the changes in the five years.)
5. The value of the whole amount of each stock at the highest price of 1873.
6. The value of the same at the lowest price of 1873.

7. The value of the same at the price on Sept. 20, 1878.

This table tells some striking tales, the sum and essence of which we may find in the footings of the last three columns, by which it appears, that these 45 kinds of stock, which in 1873, before the panic, had borne a market price equivalent to \$866,236,787 for their aggregate amount, fell after the panic (but not all at once) to \$420,845,556, and now five years later are valued only at \$461,090,613—or but 9% per cent. more than they brought at panic prices, and 81 per cent. less than the highest prices of 1873.

It thus appears that the desperate sacrifices of railroad securities, as we thought them in the fall of 1873, were not such sacrifices after all; that on the whole, nearly as much stock has grown worse since that time as has grown better. For of course the aggregates represent only the averages, and the course of individual stocks has been various, some being worth more now than in 1873, before the panic even, while some have disappeared entirely, through foreclosure sales, and many others are practically worthless.

The list of stocks which were higher Sept. 20 of this year than at any time in the year 1873 is short, consisting only of the Chicago, Rock Island & Pacific, the New York Central & Hudson River, the New York, New Haven & Hartford, the Pittsburgh, Fort Wayne & Chicago and the Union Pacific. The latter has become a dividend-paying road since 1873; the others have strengthened their credit by their prosperity and the maintenance of their old rate of dividends throughout the five years of depression. The investor considers them to have endured the severest trials they are ever likely to endure, and has confidence in them accordingly.

The list of stocks which are lower now than they were at any time in 1873 is much larger, including 22 issues by 19 companies (both common and preferred stocks of three companies.) Twelve of these are stocks which had never before the panic, or not recently, paid dividends, but seven were counted sound dividend-paying stocks, safe to depend upon under any ordinary circumstances. Such were the Albany & Susquehanna, the Chicago & Alton common, the Cleveland, Columbus, Cincinnati & Indianapolis, the Delaware, Lackawanna & Western, the Illinois Central, the New Jersey Central, the Ohio & Mississippi preferred, and perhaps also the Rome, Watertown & Ogdensburg. Two of these are nearly as high now as at their lowest point in 1873, but the decrease in value of these eight stocks has been from \$90,121,351 (at the lowest prices of 1873) to \$62,000,278, or 31 per cent.

Within the single year 1873, the market values of the forty-five stocks in our list fell about \$245,000,000, or 36% per cent., and the difference between their present value and their highest value in 1873 is still more than \$200,000,000.

Apparently, the railroads which have suffered most and those which have suffered least are pretty well intermingled geographically. Of the trunk lines one is worth more than before the panic, but all the rest are worth very much less. Of the immediate connections of the trunk lines, the Pittsburgh, Fort Wayne & Chicago has improved, but not the Lake Shore nor the Michigan Central. The Chicago roads have, perhaps, held their own best, but there has been a great reduction in the Chicago & Northwestern, Illinois Central, and a considerable one in Chicago & Alton common stocks. The aggregate value of the stocks of the six Chicago roads in the table was \$166,244,742 at the highest prices of 1873, \$103,437,327, or 38 per cent. less, at the lowest prices of that year, and is \$127,336,513 now, which is 24 per cent. less than at the highest prices of 1873, but 23 per cent. more than at the lowest prices of that year. The St. Louis roads were never dividend-paying, or never paid regular dividends, and their value was chiefly represented by their bonds. Since 1873 the stocks of the leading St. Louis roads have fallen nearly or quite to zero. There are four in our list, whose stocks were worth \$26,080,895 at the highest prices of 1873, \$10,295,710 at the lowest prices of that year, but are worth but \$3,595,710 now—not one-seventh of their highest value five years ago. Only one New England road is represented in our list, and that is worth a tenth more now than it ever was before the panic of 1873.

The greatest amount of reduction in the stocks of a single road is in the Erie. Its shares at one time in 1873 sold at prices which made their market value nearly forty millions more than it is now, and the lowest panic prices of 1873 would have made them worth \$19,260,000 more. Erie shares, however, were really not worth anything then, and the prices were only sustained by the extravagant expectations which the English holders of the stock had been led to entertain.

Our table gives only stocks which are sold on the New York Exchange, which are by no means all. Some of the most important railroads are not among them—to wit: the Pennsylvania, all the anthracite roads except the Delaware, Lackawanna & Western, all the New England roads except the New York, New Haven & Hartford, and the Baltimore & Ohio. We may say of these, generally, that they did not fall nearly as much during 1873 as most of the stocks in our table, but there has been great depression in them since, and especially in the coal stocks.

But to complete the history of the stock movement of the trunk lines, we add the figures for the Baltimore & Ohio and the Pennsylvania:

Prices of Trunk Line Stocks.			
	1873.		Sept. 20, 1878.
	Highest.	Lowest.	
Baltimore & Ohio.....	178½	144½	93
Pennsylvania (\$50 shares).....	60¾	43¾	33¾
Erie Common.....	60¾	53	13¾
" Preferred.....	82	60	31
New York Central.....	106¾	77¾	113¾

That is, Baltimore & Ohio stock is now worth 35 per cent. less than its lowest price in 1873, Pennsylvania 22½ per cent. less, Erie common 75 per cent. less, and Erie preferred 53 per cent. less; while New York Central stock is worth 46 per cent. more.

At these prices the values represented by the stocks of these four roads have been:

	1873.		Sept. 20, 1878.
	Highest.	Lowest.	
Baltimore & Ohio.....	\$23,462,218	\$18,993,225	\$12,224,013
Pennsylvania.....	83,677,292	59,917,074	46,387,385
Erie.....	53,214,596	32,631,966	13,371,442
New York Central.....	95,241,140	69,530,497	101,501,120
Total.....	\$255,595,246	\$181,072,792	\$173,483,960

In the aggregate, then, the trunk-line stocks are now worth \$82,000,000 less than at one time in 1873—32 per cent. less than at the highest prices of 1873, and even 4¼ per cent. less than at the lowest prices of that year.

And this course of prices seems justified by the facts. The Baltimore & Ohio has reduced its dividends from 10 per cent. to 6, the Pennsylvania dropped from 10 to 8, and from 8 to 6, and for a year has passed entirely; the Erie, which has not earned a dividend for ten years, has given stronger and stronger proofs of the improbability of its earning one in the future by failing to earn its interest charges and becoming bankrupt. The New York Central alone has maintained steadily its 8 per cent. dividends.

The fate of the railroads has been sad enough in reality, but the above figures make it appear worse than it really has been. The fact is, we have a very different standard from that of 1873. In the first place the quotations are all in currency, which before the panic was worth from 84 to 90 cents in gold in 1873, at the time of the panic was worth 89 cents, but now is very nearly at par. This alone makes a very great difference. Reducing to gold values, the 45 stocks in our table were worth but about \$567,000,000 instead of 666,000,000 at the highest prices of 1873, were worth \$380,000,000 instead of \$421,000,000 by the lowest prices of that year, and are worth about \$480,000,000 now, and the decrease from the highest prices of 1873 has been \$107,000,000 instead of \$205,000,000; and the increase from the lowest prices of that year has been \$80,000,000 instead of \$40,000,000. This is a most important difference, and it is an actual one, and even fails to represent the whole increase in the value of the dollar. For the gold dollar also has advanced in value; the world over it will bring more than it would in 1873. A given income in gold, in America, England, France, Germany, or anywhere else in the civilized world, will procure a better living now than it would five years ago. On the other hand, the average rate of interest has been greatly reduced, and a given price for a security, paying regular dividends, usually represents a smaller income than it ever did before in this country.

At all times in this country estimates of the value of a large proportion of the stocks of railroads have been based wholly upon the future prospects of the roads: that is, these stocks do not pay dividends and never have paid dividends, and they would not be worth anything but for the confidence that some investors have that they will at some future time earn a surplus to divide. In these cases the fall in the price of the stock may not indicate any decrease in the income of the community, but only that the public conviction is that the prospects are less favorable than they used to be.

It is not often that so long a period of depression as five years continues; and it is time now to look for a beginning of renewed industrial activity, though in this country, except in agriculture (in which production increases constantly and rapidly), we do not know that it could be found by looking for it. With a return to prosperity doubtless there will be a considerable increase in railroad profits and in the market value of the securities which receive them. But it is probable that

PRICES AND VALUES OF STOCKS IN 1873 AND 1878.

	PRICES.				VALUES OF TOTAL ISSUES.		
	Highest.	Sept. 19 or 20.	Lowest.	Sept. 20 1878.	Highest.	Lowest.	Sept. 30, 1878.
Albany & Susquehanna	95 1/2		85	81	\$3,342,500	\$2,975,000	\$2,835,000
Atlantic & Pacific, preferred	38 1/2	16	10	*	3,695,895	950,710	
Chicago & Alton, common	116	100	85	83 1/2	11,675,748	8,555,505	8,404,525
Chicago & Burlington & Quincy, preferred	119		90	101	2,846,226	2,182,860	2,449,654
Chicago & Northwestern, common	138 1/2	90	78	110 1/2	33,117,890	21,526,629	30,634,049
Chicago & Milwaukee & St. Paul, common	85	40	31 1/2	39 1/2	12,837,673	4,757,491	5,456,011
Chicago, Rock Island & Pacific, preferred	94	64	33	68 1/2	20,304,554	11,400,057	14,780,627
Cleveland & Pittsburgh, guaranteed	82 1/2	30	21 1/2	29 1/2	9,586,040	3,310,841	4,485,035
Cleveland, Col., Cin. & Indianapolis	79 1/2	57 1/2	43 1/2	68 1/2	9,758,214	5,370,086	8,361,995
Columbus, Chicago & Indiana Cen.	117 1/2	86	80 1/2	117 1/2	29,343,397	20,124,758	29,374,647
Delaware, Lackawanna & Western	90 1/2	79 1/2	67	80 1/2	10,175,590	7,533,309	9,051,215
Dubuque & Sioux City	94 1/2	78	65	81 1/2	14,167,251	9,744,670	4,722,417
Erie, common	43 1/2	19	16 1/2	41 1/2	6,115,724	2,382,506	574,982
Erie, preferred	106	86	70 1/2	80	27,772,000	20,829,000	13,084,250
Hannibal & St. Joseph, common	59 1/2	33	35 1/2	13 1/2	46,215,000	27,787,500	10,725,000
Hannibal & St. Joseph, preferred	82	68	56 1/2	31	6,999,596	4,844,436	2,646,442
Illinois Central	52 1/2	19	15	15 1/2	4,779,185	1,375,305	1,398,227
Kansas Pacific	71 1/2	33	21	38 1/2	3,615,301	1,067,435	1,950,610
Lake Shore & Michigan Southern	126 1/2	103 1/2	90	81	36,085,000	26,100,000	23,390,000
Long Island	24			4 1/2	2,400,000		450,000
Louisville & Nashville	75 1/2	70 1/2	57 1/2	67 1/2	48,875,000	28,625,000	33,025,000
Marietta & Cincinnati, 1st preferred	79		50	34	7,112,542	4,501,609	3,041,094
Marietta & Cincinnati, 2d " "	28	22	22	*	2,273,601	1,788,758	
Michigan Central	12		11	*	535,244	490,640	
Missouri, Kansas & Texas	111	80	65	71	20,799,406	12,179,833	13,302,125
Morris & Essex	40 1/2		4	8 1/2	8,669,025	856,200	
New Jersey Central	85	91	83	83 1/2	14,250,000	12,450,000	12,562,500
New Jersey Southern	123 1/2		85	37 1/2	25,441,000	17,510,000	7,773,500
New York & Harlem	38		6	*	1,900,000	300,000	
New York Central & Hudson River	140	90	90	138	12,670,000	8,145,000	12,489,000
New York, New Haven & Hartford	106 1/2	89	77 1/2	113 1/2	95,241,140	69,530,497	101,501,120
Ohio & Mississippi, common	14 1/2		11 1/2	15 1/2	22,087,550	17,360,000	24,528,775
Ohio & Mississippi, preferred	158 1/2		158 1/2		9,925,000	5,325,000	1,650,000
Pacific of Missouri	3,042,650		2,015,000		4,225,000	1,025,000	544,350
Panama	130	84	27 1/2	125	9,100,000	5,425,000	8,750,000
Pittsburgh, Ft. Wayne & Chicago	95		77 1/2	98	23,957,882	20,048,797	24,714,240
Rensselaer & Saratoga	106		94	100 1/2	7,420,000	6,580,000	7,035,000
Rome, Watertown & Ogdensburg	88		76	11	2,769,888	2,392,176	346,236
St. Louis, Iron Mountain & Southern	97 1/2		49	54	9,750,000	4,900,000	1,105,710
St. Louis, Kansas City & Northern, preferred	70		21	20 1/2	8,400,000	2,520,000	2,490,000
Union Pacific	39 1/2	16	14 1/2	60 1/2	14,514,275	5,419,888	24,527,287
Wabash	75 1/2	38 1/2	32 1/2	15	12,130,000	5,240,000	2,400,000
					\$606,236,787	\$420,845,556	\$461,060,613

* There is no price quoted now, and probably the stocks would bring very little, if anything. Some are certainly worth nothing, the roads having been sold to satisfy mortgages.

† This was before the union with the Burlington & Missouri River, in which 20 per cent. in bonds was paid to C. B. & Q. stockholders to equalize the values of the stocks of the two companies. The value at highest prices of 1873 is too great, as it is calculated on the basis of the present issue of stock, more than \$8,000,000 of which came with the Burlington & Missouri River road, the value of which at that time was certainly much less than that of the Chicago, Burlington & Quincy.

there are many stocks which still have a price which will never be enough benefited to get a dividend, while the best-paying stocks will probably gain very little. Those which pay 8 and 10 per cent. will be thought to be doing well enough, and increases of traffic then will be more likely to cause reductions of rates than increases of dividends. This is what the trunk lines south of the New York Central have most to fear. If the latter road as well as the other trunk lines had had to pass or reduce its dividends, then it is probable that with a return of general prosperity rates would be so made as, with the heavier traffic, would make it possible to increase dividends on all the roads. But it is not probable that under any circumstances the New York Central would divide more than the 8 per cent. which it has paid through the past five years of depression. The slight increase of rates which would increase its divisible surplus one-half this company apparently does not want, and with a heavier traffic and the same or lower working expenses, its tendency will be to reduce rates. To the other trunk lines it is a matter of great importance that this reduction should be as far as possible in the local and not in the through rates. The latter they must meet, and if the Central should continue to be satisfied with the margin which it has got recently, then they cannot hope to make up the deficiencies in their dividends from the through traffic, but must depend wholly upon their local traffic for the much-desired addition to their profits.

CAR WHEELS CONSIDERED MATHEMATICALLY.

There has been, and still is, a good deal of discussion of the relative cost of the service performed by chilled cast-iron and steel-tired car wheels. That is, railroad men ask the question, Which will cost the least per thousand miles run? Although this question appears to be very simple, yet, if it is carefully considered, it will be found that it is not so simple as it appears to be at first sight, and, as we know, persons are liable to fall into very serious error about it. It was discussed in the *Railroad Gazette* of Jan. 12, 1877, and again in the issue of Feb. 2 of the same year, but, owing to the frequent inquiries concerning the subject, and the many misapprehensions which exist in relation to it, some further discussion and elucidation seems desirable.

In order that there may be no misconception of the real question or matter under discussion, it will be supposed that two railroad managers both have occasion to buy wheels, and that the one concludes that he will buy and use cast-iron wheels and the other that he will use steel-tired wheels. The question will then be, what will be the cost per mile or per thousand miles run by each of the two kinds of wheels. In order to illustrate and make clear the elements which enter

into the calculation of cost of service, the same data will be assumed that were used in the article in the *Railroad Gazette* of Feb. 2, 1877, although they are known not to conform to present prices or conditions.

It was there assumed that a cast-iron wheel costs \$12.50 when new, and 50 cents for boring and fitting, or \$13 on the axle and under the car. It was also assumed that the average mileage or life of such wheels was 40,000 miles, and that the average mileage of cars was the same. The value of the old wheel when worn out was taken at \$5.50. Then the cost of the first year's service would be as follows:

Cost of new wheel on axle	\$13.00
Interest on cost for one year at 7 per cent.	.91
Total	\$13.91
Deduct value of old wheel	5.50
Net cost of service for one year	\$8.41

Now let us take the steel-tired wheel, the first cost of which was assumed to be \$56.16. In making a similar calculation for the steel-tired wheel that was made for the one of cast iron, some credit must be allowed for the value of the old wheel-centre and its tire. It is true that at the end of the first year these would not be worn out, but it would be preposterous to say that the wheel-centre would never be worn out. Everything eventually wears out, but as the life of the wheel-centre and tire cannot be determined now, to make the comparison of the two kinds of wheels quite fair, it will be assumed that the wheel-centre and tire are sold for old material at the end of each year, in order to get at the cost of the wheel service at such times. The value of the old wheel-centre and tire in the articles already referred to was assumed to be \$5.77, which is not very far from the actual fact.

The account for the steel-tired wheels at the end of the first year will then stand as follows:

Cost of new wheel and tire	\$56.16
Interest on cost for one year	3.93
Outlay at end of first year	60.09
Less value of old wheel	5.77
Cost of service of steel-tired wheel at end of first year	\$54.32

But it will be said that the wheel is then not worn out, which is true, and therefore the calculation for the two kinds of wheels will be continued for a second year. The cost of the cast-iron wheel at the end of the first year, after selling the old wheel and crediting its value, was \$8.41. It is then necessary to borrow \$13 more to buy a new wheel. The cost of the cast-iron wheels at the end of the second year will therefore be as follows:

Cost of service at end of first year	\$8.41
Cost of new wheel	13.00
Interest on these amounts	1.50
Total	\$22.91
Deduct value of old wheel	5.50
Net cost of service for two years	\$17.41

The cost of the steel-tired wheel at the end of the

second year, assuming that it required turning at the end of the first year and that the cost of doing so is \$1.25, will be as follows:

Outlay at end of first year	\$60.09
Cost of turning wheel	1.25
Interest on these amounts for second year	4.39
Outlay at end of second year	\$65.64
Less value of old wheel	5.77

Net cost of steel-tired wheel at end of second year... \$59.87

Adopting this same method of calculation the table which was published in the *Railroad Gazette* of Feb. 2, 1877, and which is reprinted below, was worked out.

Comparative Cost of Steel-tired and Cast-iron Car-Wheel Service.

Time of service.	Mileage.	Total cost cast-iron wheels.	Total cost steel wheels.	Cost per thousand miles of cast-iron wheels.	Cost per thousand miles of steel wheels.
1 year	40,000	\$8.41	\$54.32	21 1/2 cents.	\$1.36
2 years	80,000	17.40	59.87	21 1/2 "	74 1/2 "
3 "	120,000	27.03	65.81	22 1/2 "	54 1/2 "
4 "	160,000	37.33	72.17	23 1/2 "	45 1/2 "
5 "	200,000	48.35	78.07	24 1/2 "	38 "
6 "	240,000	60.14	86.25	25 "	30 "
7 "	280,000	72.76	94.04	26 "	33 1/2 "
8 "	320,000	86.26	102.37	27 "	32 "
9 "	360,000	100.71	111.20	28 "	30 1/2 "
10 "	400,000	116.17	120.83	29 1/2 "	30 1/2 "
11 "	440,000	134.84	131.04	30 1/2 "	29 1/2 "
12 "	480,000	152.68	141.96	31 1/2 "	29 1/2 "
13 "	520,000	171.78	153.65	33 "	29 1/2 "
14 "	560,000	192.21	166.16	34 1/2 "	29 1/2 "
15 "	600,000	214.07	179.55	35 1/2 "	29 1/2 "

From this table it will be seen that while the cost per thousand miles run by cast-iron wheels is greater at the end of each successive year, the cost of steel-wheel service diminishes up to the thirteenth year, when it begins to increase. It will also be seen that between the tenth and the eleventh years, the cost per thousand miles of the service of each kind of wheel is the same; so that a steel wheel, to be as cheap as cast-iron wheels at the prices and under the conditions assumed, must make a little more mileage than ten cast-iron wheels. But it will be said at once that the assumed data are not correct. The maker of cast-iron wheels will point to the fact that on some lines the products of his manufacture are giving a service of 60,000 miles per wheel. The manufacturer of steel-tired wheels may say that he can furnish them at a lower price than that assumed, and there will probably be much difference of opinion concerning the other items of expense involved. It is therefore desirable to employ some method of estimating the relative cost of the two different kinds of wheels which will be applicable to any prices and conditions, without making so long and tedious a calculation as is required in making the table above. The method of calculating compound interest by the use of logarithms will, it is thought, enable us to work out a formula which will facilitate such calculations very much.

In ordinary mercantile transactions, interest is compounded once a year. This is a purely arbitrary usage, and as it will simplify the calculations and not alter the result materially it will be assumed that the life of a cast-iron wheel and the mileage of a steel tire to one turning are the same, and that interest is compounded when the one is worn out and the other is turned. Knowing, too, how quickly unused mathematics are forgotten, a little elementary explanation, part of it copied or adapted from Young's Algebra, will be given, which those who are well up in such matters can skip.

To find the amount of a given sum in any given time at compound interest.

"Let r represent the interest of \$1 for the period at the end of which the interest is compounded, which in our case will be the life of a cast-iron wheel, and put $\$1 + r = R =$ the amount in 1 period.

"Then $\$1 : R :: R : R^2 =$ the amount in 2 periods.
 $\$1 : R :: R^2 : R^3 =$ the amount in 3 periods, etc.

"Therefore R^n is the amount of \$1 in n periods, and, consequently, the amount of \$ p is pR^n ; therefore, calling this amount b , we have

$$\log. b = \log. p + n \log. R.$$

In the case of the car wheels, the principal is increased at the end of each period not only by the interest, but also by another sum, which, in the case of the cast-iron wheel, is equal to the difference between the cost of a new wheel and the value of the old one, and in the case of the steel wheel the additional amount added, besides the interest, is the cost of turning the steel tire. In such cases "the amount of the original principal p in n periods is pR^n , and if A be the sum that is continually added, the first A will be at interest $n - 1$ periods, the second will be at interest $n - 2$ periods, etc., and therefore the sum of their amount is:

$$A R^{n-1} + A R^{n-2} + \dots + A R^{n-n}, \text{ or } A (R^{n-1} + R^{n-2} + \dots + 1).$$

Now the terms within the parenthesis form a geometrical progression, whose first term is R^{n-1} , and ratio R ; therefore the sum will be $A \times \frac{R^n - 1}{R - 1}$; there-

fore the whole amount is $pR^n + A \times \frac{R^n - 1}{r}$. If, however, A is not added the n th period then we have

$$b = pR^n + \frac{AR(R^{n-1} - 1)}{r}$$

This formula will enable us to calculate the cost of either cast-iron or steel-tired wheels after any number of the first are worn out, or after any number of turnings of the steel tires. To get the net cost, however, the value of the old wheel must be deducted at the end. Representing the value of old cast-iron wheels by v , and of the steel-tired wheels by V , the formula becomes

$$b = pR^n + \frac{AR(R^{n-1} - 1)}{r} - v.$$

As already stated, the problem which presents itself to a railroad manager, master mechanic or purchasing agent when steel wheels are offered to him at a certain price is, How much service must they render in order to be as cheap as cast-iron wheels, which will perform a known amount of service, and are sold at a given price? Thus, in looking over the preceding table, the point of greatest interest is the period when the service of the steel-tired wheel becomes as cheap as that of the cast-iron wheels; or, in other words, we want to know how many cast-iron wheels the steel tire must wear out to be as cheap as the former. To determine this let b = the total cost of the wheel service at the time when the steel tire becomes as cheap as the cast-iron wheels, and let n represent the number of cast-iron wheels worn out, the number of turnings of the steel tire and also the number of periods at which interest is compounded. We will also let p represent the first cost of the cast-iron wheel, including fitting on the axle, P the cost of the steel-tired wheel, a the difference in cost between a new and an old cast-iron wheel, and A the cost of turning steel wheels. The latter are the two sums by which the principal is increased at the end of each period.

For the cast-iron wheel service the formula then becomes:

$$(1) \quad b = pR^n + \frac{aR(R^{n-1} - 1)}{r} - v;$$

and for the steel-tired wheel

$$(2) \quad b = PR^n + \frac{AR(R^{n-1} - 1)}{r} - V.$$

Therefore,

$$(3) \quad pR^n + \frac{aR(R^{n-1} - 1)}{r} - v = PR^n + \frac{AR(R^{n-1} - 1)}{r} - V.$$

And

$$(4) \quad pR^n + \frac{a(R^n - R)}{r} - v = PR^n + \frac{A(R^n - R)}{r} - V.$$

Let $R^n = y$; then

$$(5) \quad py + \frac{a(y - R)}{r} - v = Py + \frac{A(y - R)}{r} - V.$$

$$(6) \quad rpy + ay - aR - rv = rPy + Ay - AR - rV.$$

$$(7) \quad rpy + ay - rPy - Ay = aR + rv - AR - rV.$$

$$(8) \quad R^n = y = \frac{aR + rv - AR - rV}{rp + a - rP - A}.$$

Therefore,

$$(9) \quad n \log R = \log \left(\frac{aR + rv - AR - rV}{rp + a - rP - A} \right)$$

$$(10) \quad \text{Consequently } n = \frac{\log \left(\frac{aR + rv - AR - rV}{rp + a - rP - A} \right)}{\log R}.$$

With this formula, if the prices of cast-iron and steel wheels and the cost of turning steel tires are given, with the aid of a table of logarithms, we can work out in a few minutes just how many cast wheels the steel tire must wear out to be as cheap. Of course the average time required to wear out cast-iron wheels must be learned from the records of the road, or other sources, and knowing this and the average mileage of the cars will give the mileage of the wheels, or knowing the average mileage of wheels and of the cars will give the time.

There are also some other interesting and valuable problems which may be solved by the use of these formulae. Thus supposing a manufacturer should say that he will guarantee the steel wheels which he makes to run as far as ten cast-iron wheels, it might then become a question at what price the steel wheels must be sold to be as cheap as cast-iron wheels. In that case n in the formulae is equal to 10, and P becomes the unknown quantity. Reversing formula (4), we have:

$$(11) \quad PR^n + \frac{A(R^n - R)}{r} - V = pR^n + \frac{a(R^n - R)}{r} - v;$$

then

$$(12) \quad PR^n + \frac{A(R^n - R)}{r} - v = pR^n + \frac{a(R^n - R)}{r} - V,$$

and

$$(13) \quad P = \frac{pR^n + \frac{a(R^n - R)}{r} - v - \frac{A(R^n - R)}{r} + V}{R^n}.$$

The values in this are very easily worked out if we have the n th power of R , which in the above formulae would be the tenth power. This may also be found in the well-known way by using a table of logarithms and finding the logarithm of R and multiplying it by n = index of the power, the product is the logarithm of the required number which can be found in the table, thus reducing the labor of the calculation very materially. Any of the other quantities could be worked out in a similar way if required, but probably formulae (10) and (13) will solve all the problems which will arise.

No practical application of this method of calculation has been made, and we will repeat that the data employed in illustrating the principle are merely assumptions and are not correct. Any railroad manager may apply the formula. It is true that some advantages which have not been taken into account in this article have been claimed for wheels which are accurately turned, as steel-tired wheels are. It is said that the resistance and also the cost of their repairs and the wear of the track are less if the cars run on such wheels than they are when chilled wheels which are not turned are used. Thus far, no data, that we are aware of, have been presented to prove such assertions, and in the absence of such proof it would hardly be wise to secure what may be merely imaginary advantages by the expenditure of money which is very real indeed. The object of this article has been to give the means of answering the question, Which is the cheapest kind of wheels with our present knowledge of the subject. Vague assertions and impressions should have no place in such calculations.

August Earnings.

August earnings are given in our table for 24 different railroads with 11,305 miles of road, or about one-seventh of the total in operation in the United States. These roads, with an increase of 3.4 per cent. in mileage, show an increase of 3.7 per cent. in their aggregate earnings. The earnings per mile are almost the same as last year—\$485 instead of \$484. Thirteen of the roads show larger and eleven smaller total earnings, and also earnings per mile, than in August, 1877. The large increases in earnings per mile were 65 per cent. on the Atchison, Topeka & Santa Fe, 20.4 per cent. on the Cairo & St. Louis, 30 per cent. on the Chicago & Eastern Illinois, 26 per cent. on the Denver & Rio Grande, and 26.2 per cent. on the Kansas Pacific. The large decreases are 22 per cent. on the Burlington, Cedar Rapids & Northern, 26.3 per cent. on the Chicago, Milwaukee & St. Paul, and 22.8 per cent. on the Iowa lines of the Illinois Central—all in the territory where there was an exceptionally heavy wheat crop last year and where it was greatly damaged this year.

As the average earnings this year are the same as last year, we must know whether last year's earnings in August were favorable before we can say whether they were satisfactory this year. Now last year there was a considerable revival of business in August, and a quite general increase over the earnings for the same month in 1876. Below we give the average earnings per mile in August for four years past of such roads as have reported:

	1878.	1877.	1876.	1875.
Atchison, Topeka & Santa Fe.....	\$504	\$300	\$326	\$299
Burlington, Cedar Rapids & Northern.....	241	309	212
Cairo & St. Louis.....	142	118	179	164
Chicago & Alton.....	831	725	789	694
Chicago, Milwaukee & St. Paul.....	354	483	403	451
Cleveland, Mt. Vernon & Delaware.....	219	216	210	213
Denver & Rio Grande.....	358	284	216	273
Illinois Central, Illinois lines.....	686	799	693
Indianapolis, Bloomington & Western.....	271	208	402	311
International & Great Northern.....	230	225	188	173
Kansas Pacific.....	581	460	325	401
Missouri, Kansas & Texas.....	375	411	375	345
Memphis, Paducah & Northern.....	139	136	137	150
Nashville, Chattanooga & St. Louis.....	372	444	385	404
Philadelphia & Erie.....	910	1,015	930	1,158
St. Louis, Alton & Terre Haute, Belle-ville Line.....	615	655	495	570
St. Louis, Iron Mt. & Southern.....	524	546	400	415
St. Louis, Kansas City & Northern.....	583	570	482	499
St. Louis & Southern.....	328	318	295	211
Toledo, Peoria & Warsaw.....	353	512	606	477
Wabash.....	840	781	672

Here we have reports from 21 roads for three years and from 18 roads for four years. Thirteen out of 21 have larger earnings this year than in 1876, and twelve out of 18 larger this year than in 1875. Eight of the roads have larger and three smaller earnings this last August than in any of the three preceding years. Great and progressive increases are especially noticeable on the border roads, the Atchison, Topeka & Santa Fe and the Kansas Pacific, both of which, last August had about the same earnings per mile, which were equal to those of the St. Louis, Kansas City & Northern and other roads in well-peopled districts.

The only road in the table which has any trunk-line traffic is the Philadelphia & Erie, and its earnings last August were 10 per cent. less than last year, and smaller also than in 1876 or 1875.

For the eight months ending with August we have reports from 24 roads with 12,697 miles of road. These with 2.8 per cent. more road earned 9.7 per cent. more money than in 1877, and their earnings per mile increased from \$3,245 to \$3,463, or 6.7 per cent. Fifteen of the 24 show increased total earnings, and 14 increased earnings per mile of road. Many of the increases are very large (five more than 20 per cent.), but no decrease is so much as 12 per cent. Among carriers of trunk-line traffic are the Grand Trunk, the Great Western of Canada, and the Philadelphia & Erie. The

Great Western shows a pretty large increase (9.3 per cent.), the other two small decreases.

For the rest of the year comparisons will have to be made with a period of unusually favorable earnings for many roads, as last fall there was at once a heavy traffic and good rates.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Pittsburgh, New Castle & Lake Erie.—The first track is laid, from the end of the Lawrenceville & Evergreen road, near Pittsburgh, Pa., northwest 6 miles. It is of 3 ft. gauge.

Chicago & Alton.—Track on the *Kansas City Extension* has been extended west to Glasgow, Mo., 28 miles.

Chicago, Milwaukee & St. Paul.—The *Iowa & Dakota Division* is extended from Spencer, Ia., west 12 miles.

The extension of the *Indianapolis, Decatur & Springfield* road from Montezuma, Ind., to Bruin's is 3 miles shorter than reported. We are also informed that 14½ miles of track reported laid by the *Rumford Falls & Buckfield*, from Canton, Me., to Rumford Falls, has not been built, and probably will not be at present.

The new road above reported is 46 miles, making a total of 1,245 miles completed in the United States in 1878, against 1,335 miles reported for the corresponding period in 1877, 1,599 in 1876, 761 in 1875, 1,082 in 1874, 2,691 in 1875, and 4,765 in 1872.

WATER RATES have varied less during the past week than for several preceding it. Lake rates seem scarcely to have changed at all, beginning and ending at 4 cents per bushel for corn and 4½ for wheat from Chicago to Buffalo, though it is reported that some cargoes of corn were taken at 3½. Less grain is going forward now, and as the extraordinary shipments of the three or four weeks previous have brought out nearly every craft that can carry grain, there may be an oversupply of tonnage, which, in spite of the stormier fall weather and the higher sailors' wages (\$2 a day against \$1.25 in June) may make it difficult to maintain rates.

Canal rates are a little lower on most grains than they were reported on Tuesday of last week, but that Tuesday's rate of 8½ for wheat seems to have lasted but a day or so, and most of the week since the canal rates have been nearly as they are reported for Tuesday of this week, that is, 8 cents for wheat, 7½ for corn and 5½ for oats from Buffalo to New York. Rail rates from Buffalo to New York have been advanced half a cent a bushel on wheat and corn, and now stand at 8½ cents for wheat, 8 for corn and 5 for oats. This is about equivalent to a rate of 31 cents per 100 lbs. from Chicago to New York, or more than the actual through rate. The New York railroads thus appear to be doing better with the grain they get from the lakes than with that which is brought to them by the connecting railroads west of Buffalo—which, by the way, is not now a very large amount. That so much more is done in competition with the canal than in competition with the lake is easily accounted for by the fact that the lake rate for ½ of the distance (by rail) is only about one-half of the canal rate for the other ½ of the distance. At canal rates the railroads get about 0.61 cent per ton per mile; at lake rates they would get only 0.27 cent per ton per mile. Evidently the canal has vastly more to fear from railroad competition than the lake vessels; and evidently, too, if the improvement of the Welland and St. Lawrence canals will virtually extend lake navigation to Montreal, or even to Kingston, or even make the carriage from Lake Erie to Montreal only 50 per cent. costlier per mile than from Chicago to Buffalo, the canal will be little troubled thereafter by railroad competition for export grain, as there will be a route cheaper than the canal by a third and very much quicker, which it will trouble the Erie canal, and the railroads still more, to meet in rates.

Ocean rates are lower again for grain by steam to British ports, 4½d. per bushel being taken Tuesday from New York to Glasgow, though the day before contracts were made at 5½d. to Liverpool, and 20 cents is given for transportation to Havre. By sail contracts are made at about 5s. 9d. to 6s. per quarter for grain to Cork for orders, and about the same to French ports, whither a large part of the grain is now going. Ocean rates are remarkably low, although our exports are probably the largest ever known.

At this time last year lake and canal rates were nearly the same as now, but ocean rates were much higher—10½d. per bushel by steam to Liverpool, and 7s. to 7s. 3d. per quarter by sail to Cork for orders.

THE GRAIN MOVEMENT has been falling off for two weeks past, but it still remains heavier than ever known before. This is the time of year when the spring wheat of Wisconsin and Minnesota is usually coming forward most freely, and this year there is not the usual amount to come forward—at least, not as much as there was last year. On the other hand, the winter wheat, which has formed the bulk of the business since harvest, is not marketed so freely at this season, which is the time for plowing and sowing for the next crop. No complaint can be made, however, of a decrease in business which still leaves it as large as it now is. Comparatively a small proportion of the shipments go forward by rail east of Chicago, and the quantity apparently tends to decrease, the lake vessels and canal boats getting a larger and larger proportion of the shipments from lake ports and also from Buffalo, although water rates are not lower, but rather higher, and there has been no advance in through rail rates. Rail rates from Buffalo, however, have been advanced as canal rates went up, which indicates that the New York Central and the Erie

are satisfied with the business which they are getting, which indeed is really enormous, though less than in August. The pressure of traffic is now such that there appears to be little difficulty in maintaining rates, which for grain are now practically limited by the lake and canal charges; but a heavy winter business seems probable, and in view of last winter's experience, when there was an unexampled amount of traffic which the roads carried for less than their summer and fall rates, it is extremely desirable to devise means to make the business profitable. There certainly is no reason in the nature of things why freight should be carried cheaper when navigation is closed than when it is open. The present 30-cent rate would be a great improvement on last winter's prices, and while navigation was open last fall 35 and 40 cents were collected, and at the same time a very large business was had. At the rate grain is going forward now, there will probably be a great stock near the consumers, and perhaps a smaller one with the producers, this year than last, after navigation closes. That may be a reason why not more than 40 cents or 35 cents can be had as the winter rate on grain, but it will be no reason for carrying it at cost or less.

THE STANDARD OIL COMPANY (and others) may be interested to know that the Russian Government has just given a charter for the construction of a railroad from the port of Baku, on the Caspian Sea, to the leading centres of the Russian petroleum district at Sabantchi and Surachany, which will be about 17 miles long. The petroleum now goes down to the sea in ox-carts, but one company has recently got material for a pipe line in this country. The government will supply the rails and rolling stock, and the cost for the rest is estimated at about \$575,000. The work is undertaken by the Poti & Tiflis Company, which already has a railroad in operation from the east end of the Black Sea eastward about half way to the Caspian, which will probably, when extended to the Caspian, connect with this petroleum road. The company is strictly forbidden to have anything to do with the production or sale of petroleum in any form or manner.

The product of these wells after reaching Baku goes chiefly up the Volga to a point where there is a railroad connection, where, we believe, it is refined; and thence it can be distributed readily throughout Russia. If the railroad from Poti to Tiflis were extended to the Caspian, then the wells could easily reach the Black Sea, and through it the whole of Europe; but at present the producers will be satisfied to supply Russia; and the oil region there has an area not so large as a small county in one of our states, so that it is not probable that it will have much effect on the general exports, unless it is to Russia.

GRANGERISM IN GERMANY appears in the demands of the timber-producers, not that their wood shall be carried for less, but that more shall be charged on foreign wood and timber. Of late years North Germany has been getting timber from Galicia, with a railroad carriage of 600 or 700 miles, and getting it so cheap that the price of native timber has been largely reduced. At a recent meeting of persons interested in forest culture it was resolved that the proper thing to do for the benefit of German timber culture would be to put German timber in one class and all foreign timber in another class paying a higher rate, and to enforce this by law. That is, it would have the railroads impose a protective tariff on timber by differences in rates expressly intended to destroy part of their traffic. But it appears that already the foreign timber has to pay to reach North German markets \$5 to \$6 per ton, while German timber can reach the same markets for about \$1.50. The foreign timber is carried for a less sum per mile, but it has to be carried six to eight times as far. It is a case of Saginaw lumber competing in Philadelphia with the product of Williamsport saw mills, or of Kansas wheat competing in New York with the product of the Genesee valley. There is successful competition in both cases, but it is not because of but in spite of the difference in freight charges.

LOCATING MACHINERY IN SHOPS is a matter which those in charge of the design and erection of the machine shops have in most cases find difficult to effect to the best advantage. With a complete plan of the buildings and a knowledge of the machines to be used it is difficult to locate machines to the best advantage at the first, or even after many trials. It nearly always happens after the position of some of them is laid down on the plan, changes suggest themselves which make it necessary to rub out all that have been drawn in and an entirely new start must be made. It is therefore always best to have plans of the different machines drawn on thin card board, to the same scale as that of the buildings, and then cut the plans out and paste them on the plan of the building. They can then be shifted around in any desired position, until a satisfactory arrangement is obtained, and then be permanently drawn on the plan. Very much the best way, however, is to do this before the building is erected, as it usually happens that some changes in the plan of the buildings themselves is suggested in arranging the machinery.

CAR-LOADS seem to be growing larger and larger. A few years ago 20,000 lbs. was usually the maximum allowed. Now most roads give car-load rates for that amount, but many permit 26,000 lbs. to be put into a car at the same rate. And in competing for freight, it is said that often a shipper is charged 30,000 lbs. for a car-load, and then permitted to put pretty much all that he can get into the car, not stopping at 26,000 lbs., but going up to 28,000 and even to 30,000 lbs. This has been much complained of in lumber

transportation. One would suppose that the railroad companies should know the safe maximum load of their cars and strictly forbid anything more. But the fact that more than the advertised maximum is frequently permitted, coupled with the further fact that very few accidents are reported which can be accounted for by over-loading, indicates that freight cars generally have a greater capacity than they are credited with.

FINES OF EMPLOYEES seem to be a common method of punishment on Russian railroads, if we may take the Odessa Railroad as a fair example. That company reported that in the first quarter of 1878 it had imposed no less than 1,702 fines, amounting altogether to some \$6,670 (in a depreciated paper currency). Most of these fines were imposed in consequence of "impudent reply to station-master," "refusal to work on account of feigned sickness," and "indecent behavior." Apparently the smooth working of Russian railroads has been somewhat impeded by the prohibition of the use of the knout.

A TARIFF COMMISSION has been appointed by the Council of the German Confederation to investigate and report upon any difficulties that may have arisen in the execution of the recently adopted uniform tariff system. This commission is composed of the directors of eight government and six private railroads. It receives any propositions that the different German railroads or Chambers of Commerce may submit concerning freight rates, and reports its and their recommendations concerning them to the governments of the different countries of the confederation, and to a general conference.

COAL CONTRACTS IN BELGIUM were let Sept. 5, for the supply of 96,000 tons of fine coal (*menu*) for the government railroads, at prices averaging about \$1.18 per ton of 2,204 lbs., some being \$1.08. For larger coal, something like grate coal, the lowest price bid was \$1.53.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Ohio & Mississippi, annual meeting, at the company's office, No. 59 West Fourth street, Cincinnati, Oct. 10, at 10 a. m. Transfer books closed Sept. 24.

Nashville & Decatur, annual meeting, in Nashville, Tenn., Oct. 16.

Hannibal & St. Joseph, annual meeting, at the office in Hannibal, Mo., Nov. 4, at 10 a. m. Transfer books will close Sept. 30.

Dividends.

Dividends have been declared as follows:
Dubuque & Sioux City (leased to Illinois Central), 2½ per cent., semi-annual, payable Oct. 15.
Union Pacific, 1½ per cent., quarterly, payable Oct. 1.
Utica & Black River, 2 per cent., semi-annual, payable Sept. 28.

Chicago, Rock Island & Pacific, 2½ per cent., quarterly, payable Nov. 1. The 2 per cent. is a direct dividend on the stock; the ½ per cent. is derived from a dividend of 2 per cent. on Iowa Southern & Missouri Northern stock, held in trust for the Rock Island stockholders.

Chicago, Milwaukee & St. Paul, 3½ per cent., semi-annual, on the preferred stock, payable Oct. 15.

Railroad Conventions.

The Railroad Conductors' Association of the United States and Canada will hold its twelfth annual convention at the Windsor Hotel, Montreal, Canada, beginning on Wednesday, Oct. 9.

The General Time Convention will hold its fall session at the Grand Pacific Hotel, Chicago, Oct. 10.

The Railroad Claim Agents' Association will meet at the Planters' Hotel, St. Louis, Oct. 15.

The Southern Time Convention will hold its fall session at the Windsor Hotel, New York City, Oct. 17.

The annual convention of the Brotherhood of Locomotive Engineers will be held in Indianapolis, beginning Oct. 16.

The Narrow-Gauge Convention will meet, pursuant to adjournment, in Cincinnati, Oct. 23.

The next regular meeting of the American Institute of Mining Engineers will be held at Lake George about the first of October next.

Master Car Painters' Association.

This Association held its annual convention in Cleveland, O., beginning Sept. 18. The first day's session was occupied by the usual routine proceedings, addresses, appointment of committees and similar work. A number of new members were admitted.

On the following day, Thursday, the Association proceeded to discuss the following topics:

"What makes the best head-lining filler," opened by A. N. Bradley, of the Ohio & Mississippi, followed by a general discussion of the different ways of filling and preparing the cloth. Every member gave his plan, nearly all differing in the mode of preparing, and all claiming good results. Samples were shown by Mr. Sweet, of the Grand Trunk Railway; also by Mr. Bradley, of the Ohio & Mississippi Road.

The next subject was the best filler for car bodies, a scraping filler or rough stuff. Mr. McKeon, of the Atlantic & Great Western introduced the question, which brought forth the views of the meeting and showed that a majority were using the scraper filler, which gave as good results as the old plan of rough stuff, at a less expense, and work could be got through in less time, and as for durability, many claimed it was equal to if not better than the rubbing process.

"The rubbing of varnish which gives the best lustre, a job that is rubbed or two-coat without rubbing" was the next topic. Mr. Bagley, of the Maine Central, opened this subject, but was undecided as to which was the best, and although one hour was spent on the question no decision was arrived at, there being an equal division of opinion, but those who favored rubbing would do it very lightly, merely taking off the gloss.

"Is it any longer practical to surface in any manner on the outside of a railroad car?" Mr. Shries, who was to open this subject, being absent, the question was taken up by the meeting and called forth the views of members. Some thought surfacing gave better results as to wear, as the

smooth surface would resist the action of the weather better, and others thought they would finally be obliged to do away with this expense, as it was useless where cars were so soon destroyed by the smoke and cinders and the action of alkali on most roads.

The manner of painting a car was next brought up. Mr. Robertson, of the Michigan Central, read a lengthy paper on the subject, also Mr. McKeon, of the Atlantic & Great Western. Then followed a two hours' discussion on the question.

On Friday morning the Association again met and arranged topics for discussion at the next annual meeting. Resolutions of respect were passed in memory of the late Mr. C. Grotenrath, Master Painter of the Cleveland, Columbus, Cincinnati & Indianapolis, Mr. John Hartley, late of the Lehigh Valley, and James Platt, of the Old Colony. There were a few topics of a general nature discussed, and at 11:30 the convention adjourned to meet in Detroit, Mich., in September next, the day to be set by the Secretary.

Brotherhood of Locomotive Firemen.

The proceedings in private session at the recent annual convention in Buffalo are summed up in the following statement made for publication:

The delegates have considered several amendments to the constitution and by-laws, revising and making them more simple and effective, and have sought to make the brotherhood a truly benevolent association, protecting the families of members better than heretofore, and, as they believe, making an insurance that is unequalled by that of any similar organization. The disability clause has been remodeled and various changes have been made bettering the beneficiary. They also devoted considerable time in the effort to bring about a consolidation with the International Firemen's Union, whose delegates are to meet with this convention and decide the question, which it is to be hoped will make the Brotherhood of Locomotive Firemen one of the most powerful and benevolent institutions in the country. Their whole work has been changed and revised to accommodate this new acquisition to the order.

They have also decided upon continuing the publication of a magazine, the proceeds of the publication of which will go toward charitable purposes. The office of Grand Instructor and Lecturer was created, and the duties of that officer will be to visit each lodge of the United States and Canada at least twice a year, and to organize new lodges. The financial accounts have been examined and found to be in an encouraging condition, a surplus being on hand which will be devoted to meet the current expenses. The beneficiary clause gives \$1,000 to the heirs of each member at his death, and also provides for the care of the sick and disabled.

The usual resolutions of thanks, etc., were passed. At the conclusion of the meeting the delegates joined in an excursion to Niagara Falls and a steamboat trip on the river.

ELECTIONS AND APPOINTMENTS.

Brotherhood of Locomotive Firemen.—At the recent annual convention in Buffalo the following officers were chosen: Grand Master, W. T. Goundie, Philadelphia; Vice Grand Master, J. M. Dodge, Chicago; Grand Secretary and Treasurer, W. N. Sayre, Indianapolis; Grand Instructor, S. M. Stevens, Lowell, Mass.; Grand Warden, J. O'Keefe, North Platte, Neb.; Grand Conductor, Charles Pope, Toronto, Ont.; Grand Inner Guard, W. Hugo, Indianapolis; Grand Outer Guard, T. Doyle, St. Louis; Grand Chaplain, B. Welch, Port Jervis, N. Y.; Grand Marshal, M. Coover, St. Paul, Minn.; Grievance Committee, M. E. Cobb, Worcester, Mass.; J. S. Cool, Logansport, Ind.; John McClure, Columbus, O.; John L. Bodey, Philadelphia; W. B. Whitcomb, Springfield, Ill.; P. J. Robinson, Little Rock, Ark.; A. M. Cronin, Memphis, Tenn.; D. T. Henderson, Cleveland, O.; Joseph Fritnall, Fort Gratiot, Mich.; L. H. Ingersoll, St. Joseph, Mo.; W. F. Hynes, Denver, Col.; S. Pope Myers, Louisville, Ky.

Chicago, Worthington & Washington.—Mr. Dwight Hitchcock, late of Chicago, and at one time President of the Paris & Decatur Company, has been chosen Vice-President of this company, and will have his office and residence at Worthington, Green County, Indiana.

Fort Gratiot & Lexington.—Mr. John Cole is President, and has his office at Fort Gratiot, Mich.

Marietta & North Georgia.—The officers of this company are: Wm. Phillips, President; R. F. Maddox, Treasurer and Financial Agent; H. M. Hammett, Secretary; Frank Hammett, Superintendent; E. A. Withers, Master Mechanic.

Northern Pacific.—At the annual meeting in New York, Sept. 25, the following directors were chosen: Charles B. Wright, Frederick Billings, George W. Cass, Charlemagne Tower, J. C. Ainsworth, George Stark, Alexander Mitchell, Johnston Livingston, J. Frailey Smith, John M. Dennison, Benjamin P. Cheney, Richard L. Ashhurst. The board re-elected Charles B. Wright, President; Samuel Wilkeson, Secretary; George E. Beebe, Treasurer.

Pittsburgh & Castle Shannon.—Mr. John Adams has been chosen President, in place of M. D. Hays, resigned. Mr. J. H. Ortmann has been chosen Vice-President, to succeed Mr. Adams.

Pittsburgh, New Castle & Lake Erie.—The directors of this new narrow-gauge road have chosen Cyrus Ludwig Superintendent. He has been a conductor on the Pennsylvania road a number of years.

Pittsburgh Southern.—Mr. Emile Low has been appointed Chief Engineer.

Pittsburgh, Titusville & Buffalo.—Mr. C. J. Hepburn, late Assistant Superintendent, has been appointed General Superintendent, in place of Mr. David McCargo, who still continues General Superintendent of the Allegheny Valley road. Mr. W. Howe is appointed Auditor. The offices will be at Oil City, Pa.

Prince Arthur's Landing & Kaminitiquia.—At the recent annual meeting of this Canadian Company the following were chosen: Thomas Marks, President; W. A. Preston, Vice-President; A. A. Clarke, Peter Boddy, D. Cameron, Peter Nicholson, J. P. Vigers, directors.

Pullman Palace Car Co.—Judge E. A. Lochrane, of Atlanta, Ga., has been chosen General Counsel. He has been for several years Counsel for the Pullman Southern Car Company.

Richmond, Fredericksburg & Potomac.—At a meeting held in Richmond, Va., Sept. 20, the stockholders elected Judge Robert Ould, of Richmond, Va., President, in place of John M. Robinson, who has served for a number of years. The following directors were also chosen: Isaac H. Carrington, Richmond, Va.; John S. Blackburn, Alexandria, Va.; Alfred Horner, Monrovia Robinson, Jr., Philadelphia. The directors are all new, succeeding Elihu Chauncey, C. S. Mills, H. A. Claiborne and Philip Hazall.

Rome, Watertown & Ogdensburg.—Mr. E. A. Van Horne has been appointed General Superintendent, in place of J. W. Moak, resigned. He will have his office at Watertown,

N. Y. Mr. Van Horne has been for some time Superintendent of the Lake Ontario and Syracuse Divisions.

South Carolina.—Judge Bond, of the United States Circuit Court, has appointed Mr. John H. Fisher, of New York Receiver of this road. Mr. Fisher was Receiver of the Atlanta & Richmond Air Line, and is said to be a capable and upright man. He is not in any way interested in the road.

Texas Western.—This company has been re-organized by the election of the following directors: H. H. Boody, John T. Brady, John Converse, H. H. Dooley, A. M. Gentry, C. R. Gentry, W. B. Hotchkiss, L. J. Latham, T. H. Scanlan. The board elected A. M. Gentry President; T. H. Scanlan, Vice-President; S. M. McAshan, Secretary and Treasurer.

PERSONAL.

—Elbridge L. Hill, Boston Agent of the Chicago, Milwaukee & St. Paul, committed suicide at the Parker House, Boston, Sept. 16, by shooting himself with a revolver. When found he was dead, the bullet having fractured his skull. He was well known and highly esteemed, and no cause for the suicide is known.

—Mr. F. W. Vaughan, Vice-President of the Louisville Bridge & Iron Co., with his wife, arrived home Sept. 17, after a three-months' trip in Europe.

—Mr. George W. Barker, Superintendent of the New York Division of the Pennsylvania Railroad, is dangerously ill at his residence in Jersey City. He is suffering from Bright's disease, complicated with malarial fever.

—Mr. J. W. Moak has resigned his position as General Superintendent of the Rome, Watertown & Ogdensburg Railroad. He has been on the road 18 years, beginning as Roadmaster. He retires with the hope of gaining much-needed rest and improving his health.

—Mr. Henry Barber, for 10 years General Traveling Agent of the Rome, Watertown & Ogdensburg road, has resigned his position.

—Col. B. H. Epperson, for many years a prominent lawyer of Northern Texas, died at his residence in Jefferson, Sept. 13. He was formerly connected with the Southern Pacific, now the Texas & Pacific, and also, we believe, with the Memphis, El Paso & Pacific.

—Mr. Charles L. Heywood has resigned his position as Superintendent of the Fitchburg Railroad, which he has held for 14 years.

—Mr. Albert Fink, Commissioner of the Trunk Lines, arrived in New York last Tuesday after three months' absence in Europe.

—Mr. Seth E. Marsh, formerly Engineer and Superintendent of Construction on the Connecticut Valley road, died in Hartford, Conn., Sept. 25. For some years he has been President of the Hartford Board of Water Commissioners.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending Aug. 31:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Northern Pacific.....	\$1,103,382	\$965,823	I.	22.7
Expenses.....	631,302	573,125	I.	58,177
Net earnings.....	\$562,080	\$392,698	I.	169,382
Earnings per mile.....	2,040	1,747	I.	293
P. c. of expenses.....	52.02	59.34	D.	6.42

Eight months ending Aug. 31:

	1878.	1877.		
Nash., Chatta. & St.				
Louis.....	\$1,094,535	\$1,097,636	D.	\$3,101
Net earnings.....	351,651	428,709	D.	75,058
Philadelphia & Erie	1,737,806	1,845,754	D.	107,948
Net earnings.....	553,905	501,220	D.	47,255
Pitts., Cin. & St.				
Louis.....	2,026,586			
Net earnings.....	704,038			

First week in September:

Denver & Rio Gr'de.	\$26,562	\$17,542	I.	\$9,020
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Second week in September:

Chi. & Eastern Ill.	\$17,194	\$17,228	D.	\$34
Denver & Rio Gr'de.	20,463	17,862	I.	8,601
St. Louis, Iron Mt. & Southern.....	103,100	93,993	I.	9,102

Week ending Sept. 14:

Grand Trunk.....	\$178,176	\$207,076	D.	\$28,900
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Coal Movement.

Coal tonnages for the week ending Sept. 14 are reported as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Anthracite.....	411,677	343,157	I.	68,520
Semi-bituminous.....	70,383	80,365	D.	9,982
Bituminous, Pennsylvania	38,561	38,012	D.	351

Bituminous and semi-bituminous trade is reported dull, although the Cumberland shipments for the year have made a very good showing thus far.

Grain Movement.

Receipts and shipments at Chicago and Milwaukee for the week ending Sept. 23 were:

	Receipts.	Shipments.
Chicago.....	3,068,297	2,734,618
Milwaukee.....	614,600	258,890

Chicago receipts are 10 per cent. less, Milwaukee receipts 10 per cent. greater than for the previous week.

Receipts and shipments at Buffalo for the same week were:

	Receipts.	Shipments.
By rail.....	492,700	1,401,510
By water.....	3,896,409	3,426,770
Total.....	4,389,109	4,818,280

Receipts are larger and shipments much larger than for the preceding week.

For the same week the receipts at four Atlantic ports were:

New York.....	3,701,521	Philadelphia.....	785,000
Baltimore.....	872,467	Boston.....	293,036

These receipts are much smaller than for the preceding week, when they were the largest ever known.

Corn is the largest item in Chicago receipts for the week (40 per cent. of the whole, wheat being 32 per cent.). But wheat leads in Buffalo receipts and shipments, and is 63 per cent. of the receipts at the four Atlantic ports.

Petroleum Production.

Stowell's Petroleum Reporter gives the following statement for the month of August for the Pennsylvania oil region:

	1878.	1877.	Increase.	P. c.
Production, barrels.....	1,341,928	1,273,739	68,189	5.4
Shipments.....	1,655,651	1,425,943	229,708	16.1
Stock on hand Aug. 31.....	4,717,877	2,852,544	1,865,333	65.4
Number of producing wells.....	9,884	7,684	2,200	28.6

THE SCRAP HEAP.

Railroad Manufactures.

The Bass Foundry and Machine Works at Fort Wayne, Ind., lately completed a new foundry 176 by 70 ft., with a new cupola 27 by 28 ft., and a storage shed 170 by 30 ft. The works are turning out 175 car-wheels per day.

The rattan car seats made by the Wakefield Rattan Co., of Boston, have been put in 25 cars built by Gilbert, Bush & Co., at Troy, N. Y., and 10 others built by the Wason Manufacturing Co., of Brightwood, Mass., for the New York Elevated road.

J. S. Mundy, of Newark, N. J., has lately sold to Cofrode & Saylor, of Philadelphia Bridge Works, seven of his double-cylinder, double-drum, patent friction hoisting engines for pile-driving and erection of bridge superstructures.

W. C. Allison & Co., of Philadelphia, have an order for 500 box cars for the New York, Lake Erie & Western road.

The Pacific Rolling Mills, at San Francisco, have contracts for some 2,000 tons of iron rails, chiefly 30-lbs. rails for Oregon and Washington.

The Oxford Iron Works, at Oxford Furnace, N. J., are to be kept running by Receiver Clark, with Wm. H. Scranton as General Manager.

The Cambria Iron Works, at Johnstown, Pa., are to furnish the rails for the Valley Railroad in Ohio.

The Philadelphia & Reading Coal & Iron Co.'s rolling mills at Reading, Pa., are running full double turn on iron rails.

It is understood that the Washburn Car-Wheel Co., of Worcester, will soon erect a foundry at Allston, which will give employment to about 300 men.—*Boston Advertiser.*

The furnaces of Wm. Kaufmann & Co., at Sheridan, Pa., are filling orders for pig-iron from San Francisco and Montana.

The Pottsville (Pa.) Spike and Bolt Works of George D. Roseberry have been running double turn on orders from Mexico, Cuba and Canada.

The Pennsylvania Steel Works, at Baldwin, Pa., are running to their full capacity. A new brick building for blacksmith and machine shops is nearly done.

Riehle Brothers, of Philadelphia, have finished a newly-designed duplex spring testing-machine for the Pennsylvania Railroad. It is worked with a hydraulic pump and can test two springs at once up to 50,000 lbs.

The Nashua (N. H.) Iron & Steel Co. is having made a three-high blooming train for working Siemens-Martin steel. The rolls are made by A. Garrison & Co., of Pittsburgh.

Cherokee Furnace, in Georgia, has started up and is making cold-blast car-wheel iron.

The Joseph Teas Co., at Wilmington, Del., is very busy on orders, making bolts, nuts, rivets, frogs, switches, truck-irons and forgings of all kinds.

Porter, Bell & Co., at Pittsburgh, have 120 men at work in their locomotive shops.

Jones, Lewis & Co. have started up their rolling mill at Brownsville, Pa.

Hussey, Howe & Co., at Pittsburgh, recently rolled two sheets of steel 33 ft. long, 2½ ft. wide and ½ in. thick. They are for the hull of a steamboat, which is to go to South America.

The Harrisburg (Pa.) Car Manufacturing Co. has begun work on 500 box cars for the New York, Lake Erie & Western.

Mr. Edward R. Andrews, proprietor of the Hayford Croosetting Works, at Elizabethport, N. J., has just completed a contract for treating by that process the hemlock ties for the Weehawken Branch of the New York, Lake Erie & Western.

The Canada Steel Co., at Londonderry, N. S., has now in operation a blast furnace, puddle mills, rolling mills and foundry. Londonderry bar iron is rated with Lowmoor "best-steel," and the foundry turns out a large number of car-wheels. The company owns its coal mines and makes all the coke used in the works. Bessemer steel works and a rail mill are to be added hereafter.

The Winslow Car Stove Co., at Cleveland, O., have large orders on hand, and are making 50 stoves per week.

The Hinkley Locomotive Works in Boston are building two freight engines with 16 by 24 in. cylinders for the Atchison, Topeka & Santa Fe, and two Mogul engines with 18 by 24 in. cylinders for the Fitchburg road. They have other orders on hand, and employ 200 men full time.

The rolling mill at West Newark, O., has been sold to J. M. Bronson, of Pittsburgh, and will be started up soon.

Formerly all locomotives made in this country were jacketed with Russia sheet iron, of which from 20,000 to 25,000 packages were imported annually, but since W. D. Wood & Co., of this city, commenced the manufacture of their American planished sheet iron, in 1873, the consumption of the former in this country has very greatly decreased, its annual importation since 1875 averaging no more than 1,000 packages, while during the current year it is estimated that the sales of the American planished iron will aggregate between 15,000 and 20,000 packages. As indicating more forcibly how completely the tables have been turned, the locomotives recently made and shipped to Russia by the Baldwin Locomotive Works were jacketed with the American article.—*American Manufacturer.*

Bridge Notes.

The Pittsburgh Bridge Co. has a contract for an 80-ft. bridge in Crawford County, Kan., at 14.50 per foot.

The Wrought Iron Bridge Co., of Canton, O., has a contract for an iron highway bridge, 310 ft. long, on the line between Dearborn and Ohio counties in Indiana.

The Morse Bridge Co., at Youngstown, O., has received the contract for three iron bridges in Auglaize County, O., one being 60 ft., one 100 ft., and one 140 ft. span. The prices are respectively \$9.31, \$13.20 and \$18 per lineal foot.

The American Bridge Co., of Chicago, has received some inquiries from the Chief Engineer under the Ministry of the Interior of Mexico, with respect to bridges to be built in that country.

Atkins Brothers, of Pottsville, Pa., are making beams and girders for the New York Elevated Railroad.

Notes.

In a story published this month in a popular magazine the heroine escapes from an unwelcome marriage by getting an obliging porter to shut her up in a top berth of a sleeping car, from which she is released next day, rosy and smiling, to fall into the arms of the right lover. This is all very nice, but we should think that after ten minutes or so in that closed upper berth, she would have been effectually released from all earthly marriages.

The Superintendent of a 40-mile-long railroad may be relied on generally to make more noise and fuss than the man who manages a thousand miles of road. This is human nature, we suppose; but perhaps the big man hasn't time enough to make much noise.

It must be a satisfaction to the holder of bonds or stock of a bankrupt road to know that, if he gets nothing, some worthy gentleman is getting a big salary as receiver. A receiver should receive something, surely, and he generally manages to pass a very fair share of the receipts to his own bank account, for courts generally make pretty liberal allowances. Probably he earns the money, for he is pretty sure to have no end of fault found with him.

The Erie people have now got the new name of their road painted on their ferry-boats which run between New York and Jersey City. They are large boats, but the name takes up the whole side, and hardly leaves room for the cabin windows.

Government Contracts.
Col. J. N. Macomb, United States Engineer, will receive at his office, No. 1,619 Chestnut street, Philadelphia, until Oct. 3, bids for dredging out about 16,000 cubic yards of sand, gravel and mud from Cohansey Creek, N. J. Also for dredging about 8,800 cubic yards of sand and clay from the channel at the mouth of Salem Creek, N. J.

Steel Fire-boxes Given Up.

A late number of *The Engineer* says that "after an exhaustive trial of their merits, Mr. Webb has been compelled to abandon the use of steel fire-boxes on the London & Northwestern Railway and revert to copper. Mr. Webb's confidence in the merits of steel for this purpose appears to have been misplaced." It would be interesting to know the reasons which have led to the disuse of steel.

He Got Off.

Wednesday morning a young man coming in on the early passenger train from the West got off away out beyond Boundary street. The train was waiting along lively enough and the young man had a new valise in each hand when he stepped off the car. It is believed that his feet touched the ground first; the young man himself is confident they did. But even though they got there first, his shoulders struck the hardest, and when his shoes flew off and banged up against a lumber pile at the side of the track, his astonished feet looked around in vain wonder for the ground, which was far, far beneath them, pounding itself against his back and shoulders. The valise that was coming down banged clear through the valise that was going up, and the young man rolled over his hat so often that it was spread out like a liverpad when he picked it up. The passengers leaned out of the windows to howl, "Well, you got off!" but it didn't seem to surprise him any. He looked as though he had heard something about it before.—*Burlington Hawkeye.*

OLD AND NEW ROADS.

Bell's Gap.—The following description of this really remarkable little road is given by the *Tyrone (Pa.) Herald*:

"When first erected, the road contained many curves, which wound around the hollows and projecting knobs in its course on the mountain side, many of which have since been taken out, and the work of straightening and otherwise improving the road still goes on. Four trestles bear the track across ravines in the course of the road from Bell's to Lloyd's, which in height are 25, 40, 75 and 65 feet respectively, being from 240 to 366 feet in length, 27½ degree curves on the two highest ones. The maximum grade of the road is 194 feet, the average grade for seven miles is 158.4 feet per mile; and the total elevation of the road is 1,120 feet, the summit of the mountain being 114 feet higher. The road is at present stocked with two engines, two passenger cars, three open excursion cars and 85 coal and freight cars. The buildings of the road at Bell's Mills consist of an office, freight or warehouse, engine-house, oil-house, etc., and all the necessary buildings are in position at the other end of the route. The village (Lloydsville), situated in White township, Cambria County, a little over 100 feet below the summit of the Allegheny Mountains at that point, is 8.3 miles from Bell's Mills. * * The drift to the mines enters the mountain-side at the village. The face of the mine is about half a mile from the entrance. A drainage tunnel runs entirely through the mountain, a distance of a little over one and a half miles. About 75 or 80 miners are at present working at these mines. They ship an average of 300 tons of coal per day, nearly all of which is consumed by the Pennsylvania Railroad Company."

Boston, Clinton, Fitchburg & New Bedford.—The general offices of this company are to be removed from Fitchburg to South Framingham, Mass., Oct. 10. South Framingham is at the meeting of several of the company's lines.

Boston & Providence.—The *Boston Advertiser* says: "For over two years a train daily each way over the 43½ miles between the two termini has been run in 60 minutes, including a dead stop at the crossing, a six-mile grade over Sharon hill of 35 feet to the mile, a slowing up at Mansfield and through Pawtucket over a mile, and a slacking over three bridges. The engines have 5½ feet drivers and 17-inch cylinders. The train is a baggage and smoker, and there are sometimes four 24-ton passenger and a 32-ton Pullman. While the Stonington Line fare has run along at \$1.50 through to New York, the 43½ miles with frequently eight to ten stops, and eighteen overflowing cars, have been made with the same style engines in 1 hour and 35 minutes."

Burlington, Cedar Rapids & Northern.—In the matter of the complaint of the Toledo, Peoria & Warsaw against this company for discrimination in through rates against the complainant and in favor of the Chicago, Burlington & Quincy, the Iowa Railroad Commissioners have remanded the case to the complainant for proof that it has a corporate existence in Iowa, and that it is a connecting road with the defendant's line. This, it is said, is practically a final disposition of the case.

Central, of New Jersey.—Receiver Lathrop gives notice that the income and mortgage bonds provided for by the agreement for the adjustment of the company's affairs are now ready for delivery at the office in New York, upon surrender of the receipts heretofore given.

Central Pacific.—This company has failed to make this month the statement of gross earnings which it has published regularly for several years.

The company has posted the following notice in the cars of the local trains which it runs in connection with its ferry between Oakland and San Francisco:

"The people of Oakland are hereby informed and notified that the Central Pacific Railroad Company is not allowed by law to carry passengers for hire on its local trains between the corporate limits of that city on the east and the terminus of its road at the western end of Oakland wharf and intermediate stations, and that it is not required by law to carry passengers free between said places; hence the passenger business on said local road is confined to persons going to and returning from the city of San Francisco, and does not include persons who desire to ride between stations on the east side of the bay and within the corporate limits of Oakland. Trains therefore coming west stop at stations only for the purpose of receiving passengers, and not for leaving them, except such as are coming from Alameda to Oakland. And trains going east stop at stations for the purpose of leaving passengers only. All persons therefore

RAILROAD EARNINGS IN AUGUST.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1878.	1877.	Inc.	Dec.	Per c.	1878.	1877.	Increase.	Decrease.	Per c.	1878.	1877.	Increase.	Decrease.	Per c.
Atchison, Topeka & Santa Fe.	786	711	75		10.5	\$467,000	\$255,572	\$211,428		82.7	\$594	\$360			
Burlington, Cedar Rapids & North.	434	368	66		17.9	104,443	113,025		\$9,182	8.1	241	309			
Cairo & St. Louis.	146	146				20,686	17,176	3,510		20.4	142	118			
Chicago & Alton.	678	678				563,728	491,728	72,000		14.6	831	725			
Chicago & Eastern Illinois.	159	159				83,884	64,587	19,297		29.9	528	406			
Chicago, Milwaukee & St. Paul.	1,470	1,402	68		4.9	523,000	677,050		154,050	22.8	356	483			
Cleveland, Mt. Vernon & Del.	334	298	36		12.1	34,413	33,989	424		1.2	219	216			
Denver & Rio Grande.	402	402				562,160	564,889		2,729	0.5	686	709			
Illinois Central, Illinois lines.	402	402				98,537	127,575		29,038	22.8	245	317			
Indianapolis, B'n'gton & West.	343	343				93,000	92,101	899		1.0	271	268			
International & Great Northern.	516	516				118,461	115,039	2,522		2.2	230	225			
Kansas Pacific.	673	673				380,988	309,825	81,173		26.2	581	460			
Missouri, Kansas & Texas.	786	786				294,835	323,347		28,512	8.8	375	411			
Memphis, Paducah & Northern.	115	115				15,949	17,937		1,988	11.1	139	156			
Nashville, Chattanooga & St. Louis.	349	349				129,859	154,997		25,138	16.2	372	444			
Paducah & Elizabethtown.	185	185				19,077	20,308		1,231	6.1	103	110			
Philadelphia & Erie.	288	288				262,073	262,390		30,317	10.4	910	1,015			
St. Louis, Alton & Terre Haute.	71	71				43,655	46,503		2,848	6.1	615	655			
Belleville Line.	685	685				359,100	374,165		15,065	4.0	524	546			
St. Louis, Iron Mt. & Southern.	530	530				309,103	302,206	7,077		2.3	583	570			
St. Louis, Kansas City & North'n.	354	354				116,309	112,702	3,607		3.2	329	318			
St. Louis & Southeastern.	237	237				131,145	121,274	9,871		8.1	553	512			
Toledo, Peoria & Warsaw.	688	688				577,940	531,222	46,718		8.8	840	781			
Wabash.															
Total.	11,205	10,840	365			\$5,439,074	\$5,245,409	\$193,665	\$300,008	3.7	\$485	\$484			
Total increase.					3.4										

RAILROAD EARNINGS, EIGHT MONTHS ENDING AUG. 31.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1878.	1877.	Inc.	Dec.	P. c.	1878.	1877.	Increase.	Decrease.	P. c.	1878.	1877.	Inc.	Dec.	P. c.
Atchison, Top. & S. Fe.	786	711	75		10.5	\$2,305,577	\$1,470,385	\$826,192		55.8	\$2,933	\$2,081	\$852		40.9
Burlington, Cedar Rapids & Northern.	428	368	60		16.3	992,881	615,583	377,298		61.3	2,320	1,673	647		38.7
Cairo & St. Louis.	146	146				142,402	156,058		\$13,656	8.6	975	1,070		\$95	8.6
Chicago & Alton.	678	678				3,001,096	2,829,397	171,699		6.1	4,426	4,173	253		6.1
Chicago, Mil. & St. Paul.	1,434	1,402	32		2.3	5,428,000	4,190,812	1,237,188		29.5	3,785	2,989	796		26.6
Cleveland, Mt. V. & Del.	157	157				243,179	244,514		1,335	0.5	1,549	1,557			0.5
Denver & Rio Grande.	311	281	30		10.7	678,913	464,985	213,928		46.0	2,183	1,655	528		31.9
Grand Trunk.	1,390	1,389	1		0.1	5,718,904	5,862,233		143,329	2.4	4,114	4,220		106	2.5
Great West. of Canada.	511	511				2,951,816	2,701,080	250,736		9.3	5,777	5,286	491		9.3
Illinois Cen., Ill. lines.	819	707	112		15.8	3,586,006	3,121,012	464,994		14.9	4,379	4,414		35	0.8
Iowa lines.	402	402				953,362	819,661	133,701		16.3	2,372	2,039	333		16.3
Ind., Bloom. & Western.	343	343				785,967	796,233		70,080	8.9	2,320	2,305	115		5.3
International & Gt. Nor.	516	516				806,927	806,927				1,543	1,080		137	8.2
Kansas Pacific.	673	673				2,153,013	1,930,232	222,781		11.5	3,199	2,868	331		11.5
Missouri, Kan. & Tex.	786	786				1,770,521	2,007,405		236,884	11.8	2,253	2,554		301	11.8
Memphis, Paducah & Northern.	115	115				131,476	119,824	11,652		9.7	1,143	1,042	101		9.7
Nash., Chattanooga & St. L.	349	349				1,064,535	1,097,636		33,101	3.0	3,050	3,200		150	4.7
Philadelphia & Erie.	288	288				1,737,806	1,845,754		107,948	5.8	6,034	6,409		375	5.8
St. Louis, Alton & T. H.	71	71				300,364	317,135		16,771	5.3	4,230	4,467		237	5.3
Belleville Line.	685	685				2,527,478	2,583,626		56,148	2.2	3,690	3,772		82	2.2
St. Louis, Iron Mt. & So.	530	530				2,057,175	1,906,352	150,823		7.9	3,881	3,597	284		7.9
St. Louis, K. C. & Nor.	354	354				647,013	600,207	46,806		7.8	1,828	1,696	132		7.8
St. Louis & Southeastern.	237	237				836,161	694,136	142,025		20.5	3,528	2,929	599		20.5
Toledo, Peoria & War.	688	688				3,147,365	2,879,039	268,326		9.3	4,575	4,356	219		5.0
Wabash.															
Totals.	12,697	12,354	343			\$43,906,914	\$40,089,276	\$3,817,638	\$880,132	9.7	\$3,463	\$3,245	\$218		6.7
Total increase.					2.8										

are strictly prohibited from entering the cars unless bound for San Francisco or Alameda; and all persons who violate this will be considered trespassers, and the company will not hold itself responsible for any personal injuries they may sustain while getting on or off said cars, or while they are in motion."

Chicago & Alton.—The track on this company's extension to Kansas City is now laid to Glasgow, Mo., 55 miles westward from Mexico, the commencement of the extension. From Glasgow to Kansas City most of the grading is done and all the work is well advanced. Work is progressing well on the bridge over the Missouri at Glasgow.

Chicago, Clinton, Dubuque & Minnesota.—A report reaches us, too late for verification this week, that arrangements have been made for the sale or transfer of this road to the Chicago, Burlington & Quincy. The company was formed by the consolidation of the Chicago, Clinton & Dubuque and the Chicago, Dubuque & Minnesota, and owns a line from Clinton, Ia., up the Mississippi to La Crescent, Minn., 178 miles, with a branch from Turkey River, Ia., to Wadena, 44½ miles. The present company has no bonded debt, the old mortgages having been foreclosed.

Chicago, Milwaukee & St. Paul.—The extension of this company's Iowa & Dakota Division westward was, on Sept. 19, completed to a point 60 miles westward from the old terminus at Algona, Ia., and 12 miles beyond the last point noted.

The company has bought a tract of 13 acres of land in Minneapolis, Minn., in order to secure additional yard room. Work has been begun on a new round-house with 32 stalls on this land.

The following statement is made for the eight months ending Aug. 31:

Gross earnings.	\$5,425,956.85
Expenses.	3,164,938.05
Net earnings.	\$2,261,018.80
Interest on bonds, eight months.	1,441,939.08
Surplus.	\$819,079.72

On this showing the board has declared a 3½ per cent. dividend on the preferred stock, which will take \$429,781.90, leaving a surplus of \$389,297.22.

Cincinnati Southern.—A dispatch from Cincinnati, Sept. 19, says: "Messrs. R. G. Huston & Co., contractors for the completion of the Cincinnati Southern Railway, have decided not to await a settlement of the questions pending the issue of bonds, but will commence work at once on their own responsibility. Their first effort will be directed to the construction of the section between Somerset and the coal-fields, a distance of 18 miles, and a contract has already been awarded to a Philadelphia company for six iron trestles, two of which are each 900 feet in length, for \$150,000. The work on the road will be pushed forward rapidly."

Davenport & Northwestern.—The Philadelphia Times of Sept. 19 thus speaks of a new suit, or rather an old suit revived, affecting the construction of this road, originally the Davenport & St. Paul:

"Sulzbach Brothers, the bankers, of Frankfort-on-the-

Main, Germany, have revived their claim of over a million of dollars against the estate of J. Edgar Thomson, late President of the Pennsylvania Railroad Company; Thomas A. Scott, present President; ex-Governor William Dennison of Ohio; Benjamin E. Smith, of Ohio; Andrew Carnegie, Lewis Meyer and Gardner T. McCandless, of New York, the Davenport Railroad Construction Company and the Davenport & St. Paul Railroad Company. The dispute grew out of the building of the Davenport & St. Paul Railroad. It is an old claim and was pressed against the estate of the late J. Edgar Thomson some time ago in the Orphans' Court, but the judges decided against it. Proceedings were then commenced in the United States Circuit Court against some of the above-named defendants and yesterday a bill in equity was filed in the shape of a new suit against them all.

"It appears that in May of 1868 a company was organized to build a railroad from Davenport to St. Paul, a distance of 300 miles. After a small portion of the road was built financial difficulties ensued, and a contract for the completion of the road was given to the Davenport Railroad Construction Company, of which Messrs. Scott, Thomson, Dennison and others were stockholders. This company was to receive \$20,000 in bonds of the road for each mile they completed; \$3,000,000 in these bonds were sold to the Sulzbach Bros. at 80 per cent., and \$2,400,000 were deposited with a bank in New York, subject to the call of the construction company. The road was finally sold out under a mortgage and did not realize sufficient to liquidate the bonded debt. The German bankers then began their suit, claiming that there was an overissue of bonds amounting to more than \$20,000 a mile, and held that other acts had been done detrimental to their interests and in violation of the contract for the purchase of the bonds. The answer to this bill of complaint will probably be filed by the counsel for the defendants before many days."

Fort Gratiot & Lexington.—This company has been organized to build a railroad from Fort Gratiot, Mich., where the Grand Trunk crosses the St. Clair, north of Port Huron, northward along the lake shore to Lexington, about 20 miles. The company now advertises for proposals for clearing, grading and ties.

Fort Wayne, Jackson & Saginaw.—The trustees under the first mortgage last week made a formal demand for the possession of this road, and served notice upon its officers that application would be made to the United States Circuit Court on Sept. 26, for an order to put them in possession. This action is taken under instructions from holders of one-third of the bonds, as required by the mortgage. The road is 100 miles long, from Fort Wayne, Ind., to Jackson, Mich.; the first mortgage bonds amount to \$1,500,000, and the road has been run for several years under an agreement by which all the available surplus is paid each year to the bondholders. It is said that the foreclosure is now urged by bondholders who are largely interested in the Detroit, Hillsdale & Southwestern and the Eel River roads, and who desire to consolidate the three roads, a plan which was proposed several years ago, but fell through. Since then the Hillsdale and Eel River roads have passed into the possession of their bondholders through foreclosure.

Freehold & New York.—Surveys are being made for a

proposed extension from Freehold, N. J., west by south to Allentown, about 19 miles. The line is through a prosperous farming country, most of which is not near any railroad.

Hartford, Providence & Fishkill.—It appears that the New York & New England Company is not to take possession of this road without opposition. The Hartford City Council is in doubt whether to accept payment of the \$500,000 bonds held by the city. In Rhode Island some of the stockholders have filed a bill in equity to set aside the contract under which the New York & New England claims the right to pay the bonds and take possession, claiming that it was obtained by fraud and is void. The city of Providence will not surrender the \$500,000 bonds which it holds, until this suit is decided. It is said that a similar suit will be begun in Connecticut.

Illinois Midland.—Receiver Rees has submitted to the United States Circuit Court the report ordered to be made a few weeks ago, and the following abstract is made by the Springfield (Ill.) Register:

"It sets forth that he took charge of the road in September, 1876, and that it was in such condition that he applied for and obtained permission to issue \$52,000 of receiver's certificates, for the purpose of putting the road in repair. Of these certificates he issued only \$35,000, the proceeds of which were used for that purpose. At that time the company owed about \$90,000 for pay rolls, supply bills and traffic balances, and he has paid of these \$78,990. The temporary shops at Paris were destroyed by fire, and new brick shops have been built at a cost of \$20,000, only \$4,000 of which is yet to be paid. He has also spent large sums of money in repairing and renewing bridges, engines and rolling stock, and he insists that the property has not deteriorated, but is, on the contrary, in better condition than ever before. For the six months ending Aug. 31, the earnings and expenses have been as follows:

Gross earnings (\$800 per mile).	\$120,828.90
Expenses (80.33 per cent.).	97,443.47

Net earnings (\$134 per mile).....\$23,385.43

"He reports that of these six months the weather was bad during nearly all the time, so that no freight could be hauled to or delivered from the stations. But in August the weather was better, and in that month, after paying all expenses, including the rental of 28 miles of track, the net earnings were \$11,204.15."

Indianapolis, Bloomington & Western.—The United States Circuit Court in Indianapolis, will hear argument Sept. 26, on a motion to have the decree of foreclosure and sale amended so as to permit of redemption according to the statutes of Illinois and Indiana, and in conformity with the recent decision of the United States Supreme Court in Brine against the Hartford Insurance Company. In cases of real estate sold under foreclosure the Indiana law allows no deed to be given for a year, the mortgagor having the right to redeem within that time on payment of the price bid at the sale and 10 per cent. interest. In Illinois there is a very similar law.

Indianapolis, Decatur & Springfield.—Mr. H. C. Moore, Chief Engineer and Superintendent, informs us that the extension of this road from Montezuma, Ind., to the Logansport, Crawfordsville & Southwestern, at Bruin's Junction, is 16 miles long, and not 19 as we have heretofore stated. This makes the road 101 miles long, from Decatur, Ill., to Bruin's Junction, Ind. The tracklaying on the new extension was finished in July, and it was opened for business Sept. 1. There are still 51 miles to be built, from Bruin's to Indianapolis; this has been carefully and definitely located, and will be built as soon as the company is able to do it. Mr. Moore adds, speaking of the 16 miles just finished:

"This extension has been carefully located, and has been built with first-class steel rails, 58 lbs. per lineal yard, made at Troy, N. Y., and with steel splice-plates, and Pratt's patent washers, and with first-class ties, 2,640 per mile, and it is now being ballasted with good gravel; and, when completed, it is believed there will not be a better piece of track, if any as good, in the West.

"The managers and owners of this road believe in and act upon the adage, 'that whatever is worth doing at all, is worth doing well,' and so have built their road well, and have stocked it with first-class engines and cars, and it has been well operated. In proof of this, I give you the fact that 85 miles of the road have been in use since July, 1878, with two trains daily each way (except Sunday) over it, and to this day there never has been an accident to a train, or an engine or car off the track! Can any other road in the country, of the same length, show such a record?"

Jacksonville & Rogue River.—It is proposed to build a narrow-gauge road from Jacksonville, Oregon, to Ellensburg at the mouth of Rogue River. The distance is about 95 miles.

James River & Kanawha Canal.—At a special meeting of stockholders in Richmond, Va., Sept. 21, it was voted to pay Jordan, Ballard & Co., contractors for rebuilding the canal, an additional sum of \$5,000 in money, in consideration of the losses sustained by the recent storm. The President reported the damage to the canal itself not very heavy, though the contractors had lost by damage to unfinished work.

Boats have been running for some time between Richmond and Lynchburg, but the canal is not yet fully opened to Buchanan and Lexington, the sections west of Lynchburg having been almost destroyed by last year's great freshets.

Manchester & Keene.—The contractors have nearly finished the grading from Hancock, N. H., to Keene, and have discharged a large number of their men. The Hancock Gulf trestle, 300 feet long and 76 feet high, is finished and the trestle at Marlboro, 600 feet long and 87 feet high, is nearly done. The rails have been bought and track-laying is to be begun at once. The contractors hope to have the track all down by Dec. 1, in order to secure the bonus offered by the city of Keene.

Mexican Railroads.—On the 15th of August last, 11 miles of the road-bed for a railroad from Tampico to San Luis had been completed, and work on a bridge, which had been interrupted by a flood, was resumed.

An engineer intrusted by the government with surveys for a railroad from Mexico to Cuernavaca has reported that the road would be about 94 miles long, and would be of immense advantage to the country.

There are now 8,340 miles of telegraph in Mexico, of which 5,409 miles belong to the general government, 359 miles to the several states, 300 miles to railroad companies, and the rest to telegraph companies.

A French paper devoted to colonization and public works in Mexico says: "It is to be regretted that the state of the finances of the federal treasury does not permit the government and the Minister of Public Works to put promptly in execution the projects for railroad construction whose immense importance to the republic, from a material and moral point of view, they so well recognize. But we should not lose courage on this account, for the states, efficaciously seconded by the central authority, are at this moment using all their efforts to attain this ob-

ject; and on the other hand we think we know that the government, convinced of the urgency of establishing the foreign credit of the republic on a solid basis has finally resolved to recognize in an equitable measure the legitimate claims of its foreign creditors."

Missouri, Iowa & Nebraska.—This company has agreed to extend its road from Centerville, Ia., westward 27 miles to Corydon, in Wayne County, provided the people along the line will give the right of way and raise enough to grade and tie the road. Two towns on the line have already voted a 5 per cent. tax for this purpose.

New York Elevated.—A report made by Mr. Court-right, formerly Chief and now Consulting Engineer, on the extension of this road to Kingsbridge, on the northern extremity of Manhattan Island, has been made. Seven different routes from Eighty-first to One-hundred-and-sixty-second street, and 14 from that point to Kingsbridge have been surveyed. Some of the lines provide for a surface line above One-hundred-and-tenth street, but the report recommends strongly that no surface road be built on any public street, and that where a surface road is adopted in the upper part of the city, all the street crossings be made above or below grade. The cost of watchmen, and of gates, fences, etc., will more than balance the lesser cost of building the road.

For the six days ending Sept. 21 this company reports the number of passengers carried to have been an average of 42,066 on the East Side line and 13,748 on the West Side (old) line. On the West Side line the number carried is remarkably uniform from day to day, varying only from 13,282 to 13,918; on the East Side line the greatest number in one day was 43,706, and the lowest 39,683.

New York & New England.—The Boston Advertiser of Sept. 20 says: "It will be gratifying to all interested in the fortunes of the New York & New England Railroad to learn that the money necessary to pay off the two million dollar mortgage on the Hartford, Providence & Fishkill Railroad is now in the hands of the Treasurer. The subscriptions were called in on Monday, and have all been paid, and the money is now deposited in the city banks. The company has given notice to the bondholders that they will be paid on the 1st of October next. Unless something unforeseen should occur, the New York & New England Company will take possession of the road at that time, and thereafter the whole property, from the termini at Boston and Providence to the end of the finished portion of the road at Waterbury, Conn., will then be operated under one management."

"The consummation of the present arrangement is very gratifying to all concerned, as the terms under which the money has been obtained are considered fully as favorable to the road as were those which were offered to the state. Had the state aid been granted, the company would have had at once more money at their disposal than they could have made immediately available, and would have had to begin to pay the bonus of \$150,000 a year as soon as the first draft was made on the state treasury. The sum now obtained by subscriptions is sufficient to enable the company not only to secure the possession and control of the entire property, but also to remove all shadow of doubt as to the perfection of its title. This being accomplished, the company anticipate no difficulty in raising any further amount which may be necessary to finish the road to the Hudson River, or to provide such additional terminal facilities and equipment as may be required."

"If the company does not immediately contract for the completion of its road to the Hudson it will undoubtedly build the connecting link between Waterbury and Brewster's, on the Harlem road, and thus obtain an all-rail connection with New York city independent of the New York, New Haven & Hartford Railroad, which has heretofore exercised an autocratic control of all railroad business between New York and Boston."

Northern Pacific.—At the annual meeting in New York, Sept. 25, resolutions were passed approving the action heretofore taken by the directors in all respects; requesting the board to contract for the extension of the road from the Missouri to the Yellowstone River at as early a date as prudence and a due regard for economy will permit; and instructing the board to subscribe for a controlling interest in the stock of the Minneapolis, St. Cloud & Sauk Rapids Company, and to lease the road when finished at 35 per cent. of the gross receipts. This last resolution, however, is not to take effect provided suitable arrangements can be made for the use of the St. Paul & Pacific track between Sauk Rapids and St. Paul within 60 days.

Oil Transportation.—The investigation of the charges against the transportation lines made by a number of oil producers, was begun at Titusville, Pa., Sept. 19, before Mr. Jas. Atwell, Deputy Secretary of Internal Affairs. Some of the accused companies were represented by counsel, but it was stated that the officers of the Standard Oil Company would refuse to appear and testify. Several oil shippers testified as to refusals to furnish cars, and when obtained and loaded with their oil that they were billed to members of the ring instead of to the shippers' consignees; also, to the Standard using the road-bed of the Erie Railway in McKean County, on which to drill their own wells and so drain the oil from the adjoining lands; also, to the efforts to obtain an independent outlet, which was checked by the threat of the Pennsylvania Railroad to cut off the traffic from the Buffalo, New York & Philadelphia road if they permitted parties outside the ring to ship oil over it. The inquiry continued two days and was then adjourned until this week, at Harrisburg.

Pacific Railroads and the Government.—A Washington dispatch says: "There are several important cases in which the United States is concerned to be argued before the Supreme Court at its approaching session. The first series of these are the well-known Credit Mobilier cases, which are in the Supreme Court on appeal from a decision of Judge Hunt in the United States Court for the District of Connecticut. These suits are brought under a statute of 1873 to recover from the Credit Mobilier certain moneys alleged to be wrongfully obtained from the Union Pacific Railroad Company, the object of the Government being to have these funds restored to the company in order that it (the company) may be able to meet its liabilities to the United States. The decision of Judge Hunt was to the effect that the suit could not be maintained, and was therefore against the United States. The case has since been argued in the Supreme Court, but its re-argument was ordered by the court, it being understood that there is some difference of opinion in the court upon the question involved."

"Another important Pacific Railroad case is that known as the five-per-cent. suit, the government demanding 5 per cent. per annum of the net earnings, under the original law, in payment of the debt due the United States. This suit involves the question of what are the net earnings of the road, and, further, at what time the road was legally completed. The act passed at the last session of Congress in regard to the net earnings took effect June 30 last, but did not affect any rights of the United States or of the companies existing prior to the passage of the act."

Pennsylvania.—The August statement shows, for all lines east of Pittsburgh and Erie, as compared with August, 1877:

An increase in gross earnings of.....\$189,486
A decrease in expenses of.....123,148

Net increase.....\$312,634

For the eight months ending Aug. 31, as compared with the same period in 1877, there was:

An increase in gross earnings of.....\$961,423
A decrease in expenses of.....539,390

Net increase.....\$1,500,513

For the eight months all lines west of Pittsburgh show a deficiency in meeting all liabilities of \$532,680, being a gain of \$319,203 over the same period in 1877.

A telegram from Philadelphia to the New York World, dated Sept. 25, says: "Colonel Scott being at Niagara, and First Vice-President Roberts still in Europe, little was done at the meeting of the directors of the Pennsylvania Railroad to-day beyond discussing favorably the statement telegraphed yesterday. Nevertheless it is well understood that at the next meeting it will be voted to lay aside 1 or 2 per cent. as a special sinking fund for the redemption of the securities of the road and its leased and guaranteed companies. Nearly all these are now at or above par, but could more easily be extended if there was a fund behind them for their redemption. This contribution from the earnings will probably be made absolute and not contingent upon dividends. The earnings of the road will, however, be more than \$4,000,000 net, and enough to pay a 2 or 2½ per cent. cash dividend, which will be declared within a month. This may be considered as settled, for the earnings already are enough to pay it."

Pittsburgh, Cincinnati & St. Louis.—This company's statement for the eight months ending Aug. 31 is as follows:

Gross earnings.....\$2,026,586
Expenses (65.16 per cent.).....1,320,548

Net earnings.....\$706,038
Interest on bonds, eight months.....446,526

Surplus.....\$259,512

Gross earnings include interest received on equipment hired; expenses include interest on car-trust cars and rental of Monongahela Extension in Pittsburgh.

Pittsburgh, New Castle & Lake Erie.—The grading of this narrow-gauge road is now nearly completed from the end of the Lawrenceville & Evergreen road, near Pittsburgh, northwest to Harmony, about 30 miles, and six miles of track have been laid at the Pittsburgh end. Contracts were to be let this week for 12 miles of grading from Harmony through the Concoquenessing Valley to Wurtemburg.

Pittsburgh, Titusville & Buffalo.—For some time past this road has been run in close connection with the Allegheny Valley, and the two roads have had the same officers. On Sept. 23, however, this arrangement ceased, and the general offices of the road have been removed from Pittsburgh to Oil City, Pa., new officers being appointed. It is said that this change results from some misunderstanding between the two companies. The connection between the two roads will not be broken, however, though each will have its separate management.

Richmond, Fredericksburg & Potomac.—A special meeting of stockholders was held in Richmond, Va., Sept. 20, to reconsider the action taken at the last special meeting in regard to reestablishing the steamboat connection between Quantico and Washington and the proposed contract with the Potomac Steamboat Co. A resolution was offered by C. F. Mayer, of Baltimore, that in consideration of the objections made, and to avoid the tedious and costly litigation in which the company would be placed in its defiant antagonism to the state government, the board of directors be instructed to take no action in relation to the Potomac Steamboat Company without further instruction from the next general meeting of stockholders. After a lengthy discussion the resolution was rejected on a recorded vote—yeas, 2,126; nays, 4,872. This ratifies the action of the last meeting for the reestablishment of the boat line. The stockholders then proceeded to take summary revenge on the opponents of the steamboat line in a somewhat unexpected way, by voting to elect a new President and board of directors, which was done, Judge Ould, of Richmond, being chosen to succeed Col. John M. Robinson, with an entire new board. The vote stood about the same as that on the resolution. It is probable that this action will lead to renewed trouble with the connecting line between Quantico and Washington.

Rumford Falls & Buckfield.—Some time since it was stated that this company had opened its road to Rumford Falls, Me., by rebuilding the old Portland & Oxford Central from Mechanics' Falls to Canton, 27½ miles, and building 14½ miles of new road, from Canton to Rumford Falls. It now appears that this statement was incorrect, as far as the new road is concerned. The company was, early in the year, appointed Receiver of the Portland & Oxford Central road, which was closed as unsafe by the Maine Railroad Commissioners several years ago, and has since been practically abandoned by its owners, and it has rebuilt and is now operating the 27½ miles of that road. No new road has been built, however, and there is no present intention of building any. Surveys are being made from Canton to the Rangeley Lakes, but only with the object of building a carriage road.

Southern Pacific.—A new company has been organized in Arizona to build this road from Fort Yuma to the eastern boundary of the territory. The incorporators are all officers or directors of the Southern Pacific Company of California. The object of this organization, it is said, is to secure the advantages of the special grant made by the Territorial Legislature of Arizona, Congress having voted to annul the former act, on the ground that the Legislature had no power to confer special privileges on a foreign corporation.

Notice is given that D. O. Mills and Lloyd Tevis, trustees, have \$100,000 in gold applicable to the redemption of bonds of this company, and that they will receive bids for the sale of bonds to them at their office, Fourth and Townsend streets, San Francisco, until Oct. 22.

Williamstown.—Bondholders of this company who have agreed to the sale of their bonds to President Freeman, of the Camden & Atlantic Company, as arranged by their committee, are required to deposit them with the Guarantee, Trust & Safe Deposit Company in Philadelphia by Oct. 1. The amount agreed upon for the bonds will, it is said, pay each holder about 8 per cent. of the face of the bonds. The road is about 9½ miles long, from Atco, N. J., to Williamstown, and does not earn its working expenses, but it may be of some use to the Camden & Atlantic as a branch. Under the proposed arrangement that company will secure it for \$20,000 and the cost of foreclosure.

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Burlington, Cedar Rapids & Northern.

This company operates the following lines:

	Miles.
Main line, Burlington, Ia., to Albert Lea, Minn.....	252
Milwaukee Division, Linn, Ia., to Postville.....	94
Pacific Division, Vinton, Ia., to Holland.....	48
Muscatine Division, Muscatine, Ia., to Riverside.....	31
Iowa City Division, Elmira, Ia., to Iowa City.....	10

Total.....435

Of the main line 11 miles, from Manly Junction to Northwood, is leased from the Central, of Iowa, and 12½ miles, from State Line to Albert Lea, from the Minneapolis & St. Louis, leaving 411½ miles owned. The main line from Plymouth to Albert Lea, 38½ miles, was opened near the end of September, 1877; the Pacific Division from Trar to Holland, 24½ miles, about the beginning of the same month, and the Iowa City Division was acquired only a month before the close of the year. The report is for the year ending June 30, 1878.

The equipment consists of 37 locomotives; 16 passenger, 1 sleeping, 7 combination and 5 baggage, mail and express cars; 728 box, 51 stock, 295 coal and flat and 21 way cars; 3 snow-plows, 1 pile-driver, 1 tool, 2 derrick and 3 laborers' cars; 87 hand, 100 rubble and 3 iron cars. There are also 200 box cars leased under an agreement to purchase by installments. Four engines, 2 passenger, 2 combination, 2 baggage, 25 stock and a number of hand, etc., cars were added during the year.

The general account is as follows:

Stock (\$24.301 per mile).....\$10,000,000.00
Bonds (\$16.160 per mile).....6,650,000.00
Balance of unfunded debt.....147,382.10
Balance of income account.....848,168.62

Total.....\$17,645,550.72

Cost of road, etc.....\$11,495,800.00

Paid by M. & St. L. Co. for 12½ miles road in Minnesota.....150,000.00

New construction, equipment and improvements.....631,985.94

Other expenses, interest, etc.....363,564.78

Stock (\$4,500,000) and bonds (\$504,200) unissued.....5,004,200.00

Total.....\$17,645,550.72

The bonded debt consists of \$6,500,000 of the company's own 5 per cent. bonds and \$150,000 Minneapolis & St. Louis 7 per cent. bonds guaranteed.

By the previous report suits on old accounts were pending against the company, amounting in all to \$354,703.87. Of these suits \$294,757.25 have been settled and dismissed; \$3,000 are still pending and \$56,946.62 awaiting the result of an appeal to the Supreme Court.

The earnings for the year were as follows:

1877-78. 1878-77. Inc. or Dec. P. c.

Passengers.....\$308,924.84 \$289,015.66 I. \$39,909.18 14.8

Freight.....1,264,475.72 656,466.10 I. 608,009.62 92.6

Express, Mail, etc.....41,362.07 42,002.13 D. 640.06 1.5

Total.....\$1,614,762.63 \$967,483.89 I. \$647,278.74 66.9

Expenses.....1,054,451.57 771,063.27 I. 283,388.30 36.8

Net earn.....\$560,311.06 \$196,420.62 I. \$363,890.44 185.3

Gross earn. per mile.....3,919.33 2,629.03 I. 1,290.30 49.1

Net earn. per mile.....1,359.98 533.75 I. 826.23 154.7

Per cent. of expenses.....65.30 79.70 D. 14.40 18.1

The income account for the year, somewhat condensed, is as follows:

Net earnings.....\$560,311.06

Interest, real estate sold, etc.....66,376.28

Total.....\$626,687.34

Coupons paid, and gold premium.....335,709.99

Balance.....\$290,977.35

Deduct bills, accounts, etc., receivable.....\$54,254.21

" cash on hand.....12,279.82

Balance.....\$224,443.32

Debits of old Co., and costs of reorganization.....\$25,089.79

Construction and equipment.....384,448.33

Materials on hand.....179,386.17

Paid on construction in excess of income in 1877.....28,821.33

Total.....\$1,242,574.07

Excess of payments.....\$393,302.30

This excess is represented by \$129,028.23 bills payable, \$130,000 temporary loans, and \$134,274.07 unpaid bills, etc. Against this debt, besides the cash, receivables and material as above, the company has \$4,500,000 unissued stock, \$504,200 bonds and 38½ miles of unencumbered road.

The traffic for the year was as follows:

Train mileage: 1877-78. 1878-77. Inc. or Dec. P. c.

Passenger.....359,534 307,532 I. 52,002 16.9

Freight.....551,771 354,765 I. 197,006 55.5

Service.....69,230 83,478 D. 14,248 17.1

Switching.....112,984 71,611 I. 41,373 57.4

Total.....1,093,219 817,386 I. 275,833 33.7

Passenger train-car mileage.....1,166,620 1,217,958 D. 51,338 4.2

Freight-car mileage.....8,680,632 4,397,562 I. 4,283,070 97.4

Passengers carried.....287,634 251,809 I. 35,825 14.2

Passenger mileage.....9,097,369 7,834,138 I. 1,263,231 16.1

Tons freight carried.....1,000,527 654,067 I. 355,460 55.1

Tonnage mileage.....54,048,610 25,835,438 I. 28,213,172 109.2

Av. train load:

Passengers, number.....25.31 25.47 D. 0.16 0.6

Freight, tons.....97.95 72.82 I. 25.13 34.5

The tonnage mileage includes 7,472,308 ton-miles of company's freight. Total tonnage of coal was 63,327 tons, or 8,845,614 tons hauled one mile. The average receipt and cost per ton and per passenger per mile was as follows:

Receipt. Cost. Net.

Per passenger per mile.....\$3.39 cts. 2.42 cts. 0.97 ct.

Per ton per mile, paying freight.....2.71 " 1.73 " 0.98 "

Per ton per mile, all freight.....2.34 " 1.49 " 0.85 "

The cost of locomotive service was 18.9 cents per mile.

During the year 2,865 tons steel, 1,545 tons iron rails and 151,619 new ties were laid down; 55.95 miles of track were ballasted. Three masonry piers were built, a number of pile piers renewed, 893 feet truss bridging and 5,428 feet of trestle renewed. Several new buildings were put up and others improved.

The extension of the Pacific Division has brought much traffic to the road. The Minneapolis connection has not brought much through traffic, but has placed the company in a position to demand consideration for its claims when necessary.

The old traffic agreements with the Chicago, Burlington & Quincy and the Chicago & Northwestern have been terminated and new ones made.

The great improvement in traffic was due to better crops along the line, the business of the road being still chiefly local.